9.5.2 Verification and potential replacement of diode bridge

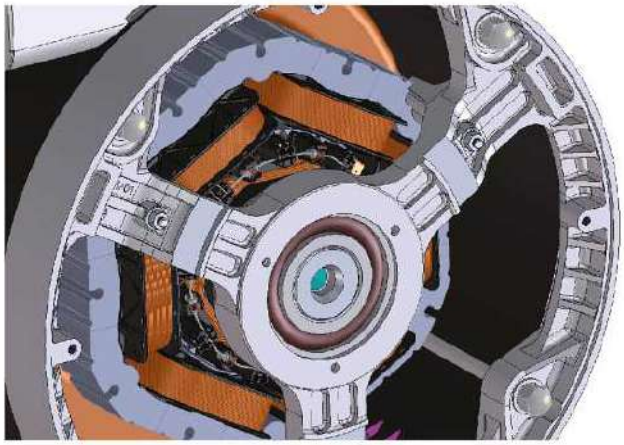
Type of intervention	Operator	Periodicity

PPE to wear	Materials and equipments
	Workshop tools.

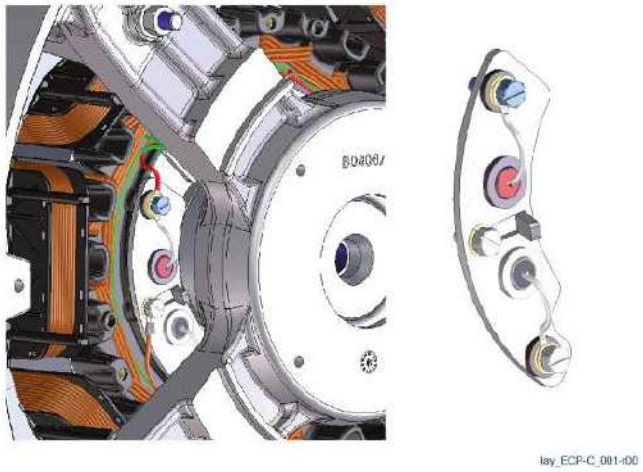
Danger

Disconnect the alternator from the power supplies. The drive motor must be off and unplugged from its power supplies.

ECP 4-28-30



ECP 28-30-32-34



ECP series alternators are equipped with button-type diodes, mounted directly in the exciter holder (series 4-28-30), or mounted on a removable diode bridge (T30), divided into three sectors (series 28-30-32-34).

In case of T30 diode bridge, each single diode can be easily inspected with a diode check multimeter specially set for diode check; completely disconnect the three sectors and check each diode (2 per sector) in both directions. In the event of one or more failures, it is advisable to replace the complete bridge. Once the whole bridge, is replaced, remember to tighten the screws with a suitable tightening wrench (par. 9.6) and to strictly comply with the polarities (figure above for ECP 28-30-32-34, figure A and B for ECP 4-28-30).

In order to simplify the access to the diode bridge we recommend to remove the main rotor (if the alternator is not coupled with the engine) or the non drive end bracket. In this last case it is sufficient to unscrew the stay bolts and use a special extractor to remove the bracket.

In case of 4-28-30 alternator series, follow the steps in order to verify the diodes.

Necessary equipment :

A. 12V battery

B. 12V-21W lamp (or arternatively 6.8Ω - 30W resistance)

C. Voltmeter (for instance, multimeter on scale VOLT d.c)

before performing the following actions, it is necessaty to disconnect the 2 cables connecting the main rotor to the diode bridge (+ and -).

Test of the diodes on the "negative"

-) Connect the equipment, as it is pointed out in the picture A

-) Fix the cable connected to the lamp to the negative terminal of the bridge, as it is pointed out in the picture A

-) Connect the terminal "Probe" (Y) to the point A1, A2, and A3 in sequence to check the diodes 1,2 e 3 respectively; check the readings on the voltmeter in relation with what is reported on the table.

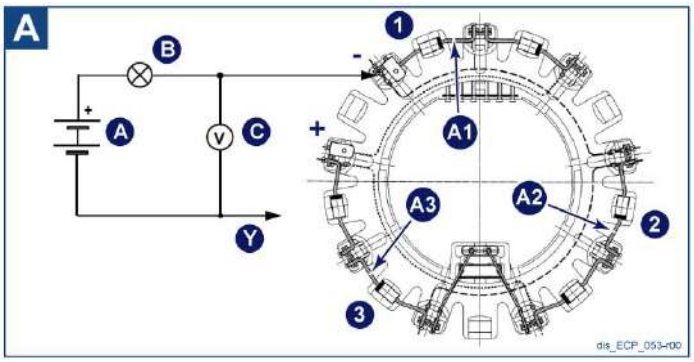
Test of the diodes on the "positive"

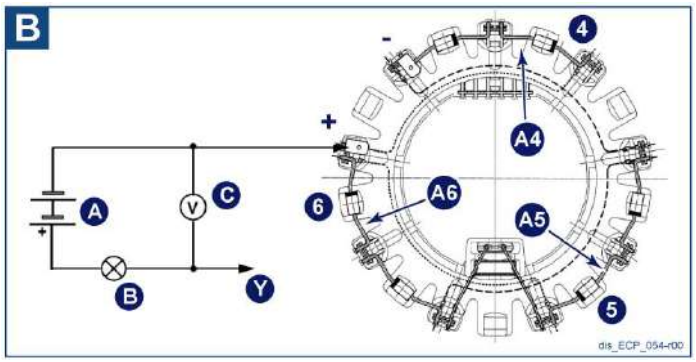
-) Connect the equipment, as it is pointed out in the picture B

-) Fix the cable connected to the negative terminal of the battery to the positive terminal of the bridge, as it is pointed out in the picture B

-) Connect the terminal "Probe" to the point A4, A5, and A6 in sequence to check the diodes 4,5 e 6 respectively; check the readings on the voltmeter in relation with what is reported on the table.

4 POLE	MEASURED VOLTAGE		
ALTERNATOR TYPE	GOOD DIODE	SHORT CIRCUIT DIODE	OPEN DIODE
ECP4/4	0.8V ÷ 1.2V	<0.6V	>1.3V
ECP28/4	0.8V ÷ 1.2V	<0.6V	>1.3V
ECP30/4	0.8V ÷ 1.2V	<0.6V	>1.3V





Instruction to replace the diode

When the values measured point out a diode damaged, it is necessary to replace the component. For this purpose it is recommended to not pull the rheophores out from their locations, but to cut them near to the body of the component; then fit in the new component respecting the polarity and soft solder accurately the rheophores with the pieces remained in their locations.

9.5.3 Mechanical disassembly for inspection

Type of intervention	Operator	Periodicity
PPE to wear		**Materials and equipments**
		Workshop tools.

Danger

Disconnect the alternator from the power supplies. The drive motor must be off and unplugged from its power supplies.

Summary Disassembly Procedure.

Front Cover	To remove the front cover gently tap with a rubber mallet.
Rotor	The rotor is extracted from the front side; in performing this operation care must be taken to ensure the rotor does not fall. During this operation you must be very careful not to damage the rotor windings.
Rear bracket	To dismantle the rear bracket, it must be secured to a suitable lifting system and an extractor must be used. With the extractor, the shaft must be pushed until the bearing comes out completely from its seat.
General Inspection	Examine every component (windings: exciter, auxiliary winding, stator and rotor) to check the presence of damages. Carefully check whether the crimp connectors are damaged.
Stator/Frame Inspection	• Carry out a visual inspection of the stator and of the frame. • Remove all dirt and dust. • Repair all potential damages to the windings. • Inspect the cable terminals and make sure they comply with the applicable regulations.
Shaft Inspection	Examine the shaft and the housings for the keys to check the presence of any sign of corrosion, burrs or wear. Clean them and, if necessary polish them. If the degree of wear of the shaft is too high, take it to a service center for repair or replacement.

Front/Back bearing disassembling

- Both bearings must be removed using the appropriate extractors.
- The sizes of the bearings must be measured accurately to check the presence of excessive wear.
- In case of excessive wear or anomalous noises / vibrations, replace them.

Electrical Inspections

Check the cable terminals and make sure they guarantee good contact. Make sure there are no signs of corrosion and/or oxidation.
Check whether the cable sheath is undamaged. If there are damage signs, repair or replace the cable.
Using adequate tools, check the resistance, the continuity and the insulation of the following windings (see paragraph 9.5.10):

- Main Stator.
- Auxiliary Winding.
- Main rotor.
- Exciter Stator.
- Exciter Rotor.
- Thermal probes (if present).

Check whether the diodes and the varistor are damaged.

All the measurement tools must be calibrated.

Insulation checks

Check the insulation resistance of the following windings:

Main Stator:

- Between phases and between phases and ground.
- Between phases and the auxiliary winding.
- Between auxiliary winding and ground.

Main rotor and exciter rotor:

- Between winding and ground.

Exciter Stator:

- Between winding and ground.

The AVR may be controlled on a static bench or during the operating test of the machine

See paragraph 9.5.10.

The internal windings of the machine might need accurate cleaning. Use an appropriate solvent or hot water. Dry them and, if necessary, impregnate them again.

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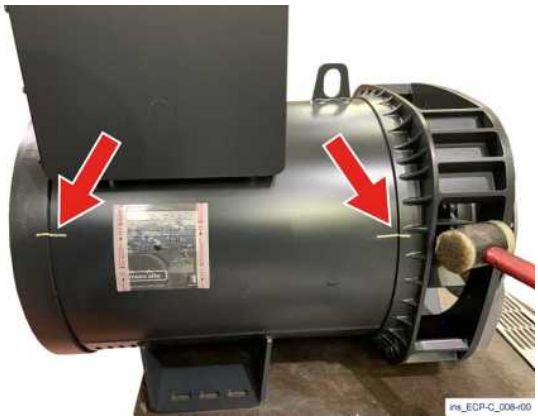
Detailed disassembling procedure

1) Remove terminal box lid and rear grid.

2) Cut cable tie of the regulator wires, remove the yellow and blue cable from regulator and pull it through its hole in the frame.

3) Remove the cover stay bolt.

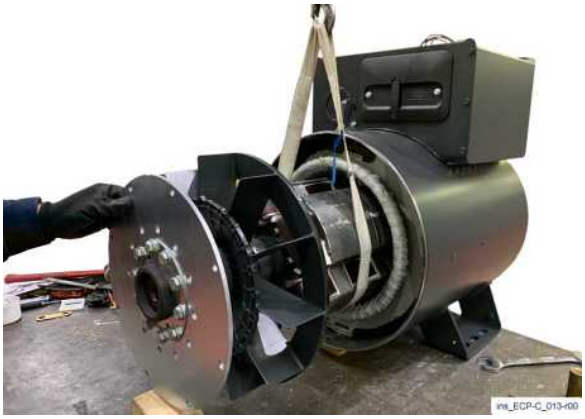


4) Remove the drive end bracket using a soft hammer. Note that the position of the drive end bracket and non drive end bracket respect of the frame was signed using a pen.

5) Tie the non drive end bracket with an opportune lifting system, insert an M16 screw in the threaded hole of the shaft and, using an extractor, push the shaft untill the bearing is completely out from the N.D.E.

6) Remove the N.D.E. using a hammer and a aluminium or copper bar.

7) Extract the rotor pulling it manually. During this operation, position wood blocks under the disks, in order to substain the rotor.



8) When possible position a soft rope in the rotor pack, and during the extraction of the rotor move the rope till it reach the equilibrium point. Lift the rotor and position it in a secure place.

9) Using an opportune extractor, remove the bearing from the shaft. Remove the exciter rotor using an arms puller.

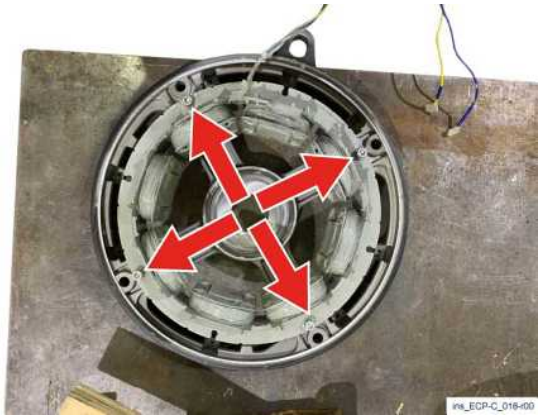
10) Remove the screw of the exciter stator.

11) Using a leverage, remove the exciter stator.

9.5.4 Mechanical assembling

Reassembling bearings	Heat the bearings in an appropriate induction equipment. Insert them into the shaft by pushing them to the end stop against the shoulder. The heating temperature must not exceed the limit imposed by the manufacturer.
Rotor	Reassemble the rotor being very careful not to damage the windings.
Front Cover	To remove the front cover gently tap with a rubber hammer.
Back cover	During the assembling check the voltage of the exciter stator wires to avoid damaging them.
Fixing rod/bolts	To assemble the fixing rods and bolts use new washers and tighten them with the correct tightening torque. In case of double-bearing alternators, once assembled, turn them manually to check whether there are impediments and anomalous noises. In case of single-bearing alternators, this check must be carried out during the test, after the coupling with the drive motor.

Assembling Procedure



1) Place a new exciter stator on the N.D.E bracket legs with the yellow/blue wires positionned on the top part (see image on the side), then push the stator till the bracket with a soft hammer. Insert its screw and tighten it as 9.6.

2) Using a press, insert a new exciter rotor on the shaft. Alternatively it's possible to heat it till 110 °C and push it till the shaft shoulder. Pull the main rotor wires through the exciter rotor hole and fix it in the diode bridge with the correct polarity.

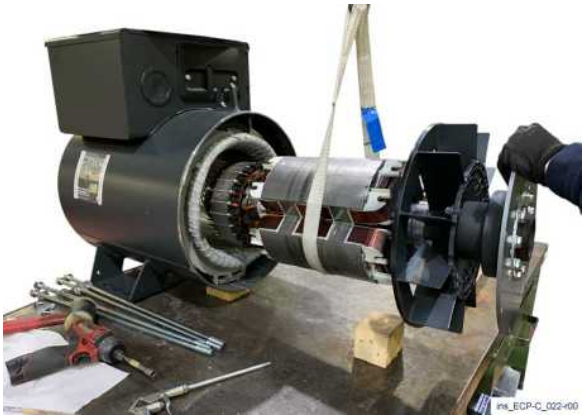
Caution

Using opportune anti-scald gloves.

Heat up the bearing till 110 °C.

See par. 9.4.1.

4) Using opportune anti-scald gloves, insert the bearing till the shaft shoulder.



5) Lift the rotor using a soft rope, insert it in the stator and pull it till the stator and rotor pack are aligned.

6) Tie the non drive end bracket with an opportune lifting system, re-insert the yellow and blue wires through the apposite hole in the frame, then insert the non drive end bracket in its place.

7) Screwing a threaded bar in the threaded hole in the shaft and screw a nut in it, interposing an adeguate flange between nut and non drive end bracket. Screw the nut till the bearing reach the the N.D.E. bracket shoulder.

8) Insert the drive end bracket matching the signs made previously, then insert the cover stay bolts. Finally, connect the blue and yellow cable on the regulator in the same previous position and fix it with cable tie. Then fix the rear grid and the cover of the terminal box.

9.5.5 Removal of disc holder hub (34 series)

Type of intervention	Operator	Periodicity

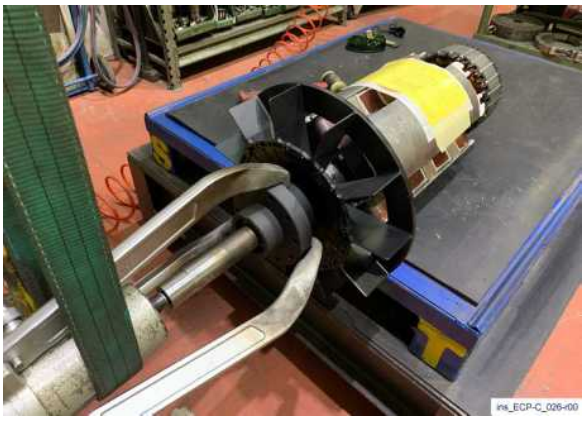
PPE to wear

Materials and equipments

Workshop tools.

Danger

Disconnect the alternator from the power supplies. The drive motor must be off and unplugged from its power supplies.



1) Remove flywheel from hub, mount an apposite hydraulic or pneumatic extractor and pressurize it.

2) Heat up the hub with an oxyacetylene torch, maintaining continuosly pulling the extractor till the complete extraction of the hub.

Before reassembling the hub heat it to 250 °C for 1 hour.

Caution

Removing the hub using the torch (and therefore high temperatures) will damage the plastic fan, located immediately behind the hub. Therefore before replacing the hub it is also necessary to replace the fan; in this regard it is recommended to mark the position of any balancing weights applied on the fan so that, once the new fan has been replaced, the weights are reapplied in the same position on the fan and in the same position with respect to the rotating parts. This will allow for a balanced machine and proper cooling of the alternator during its operation.

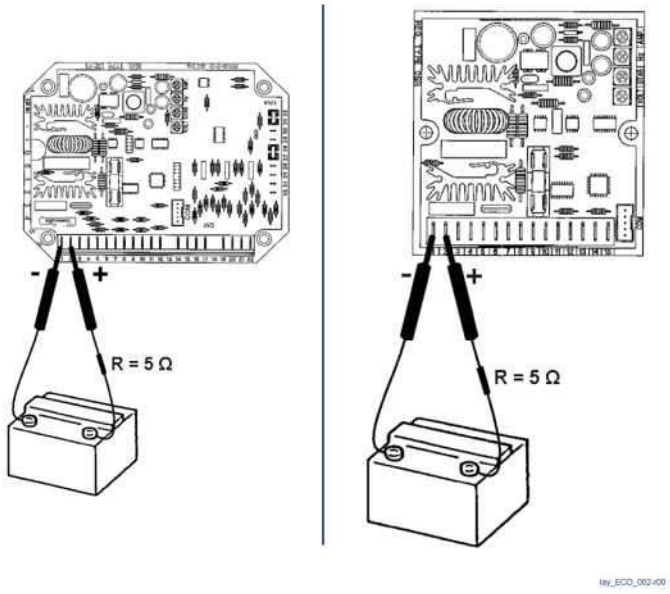
9.5.6 Loss of residual magnetism (reexcitation of the machine)

Type of intervention	Operator	Periodicity
PPE to wear		**Materials and equipments**
		Battery, electrical wires and resistance.

Danger

Disconnect the alternator from the power supplies. The drive motor must be off and unplugged from its power supplies.

The following procedure applies to the alternators equipped with an electronic regulator and must be applied in case the alternator does not self-excite (in such case, even if rotating at nominal speed, voltage is not present in the main terminal block of the alternator):



- With the alternator off, remove the cover of the terminal box.
- Prepare two terminals connected to a 12 Vdc battery possibly with a 5 Ω resistance in series.
- Use the electrical diagrams provided by Mecc Alte to identify the “+” and “-“ terminals of the electronic regulator.
- Start the alternator.
- Apply for an instant the two terminals to the previously identified terminals being very careful to respect the polarity (“+” terminal of the regulator with the “+” terminal of the battery, “-” terminal of the regulator with the “-“ terminal of the battery).
- Use a voltmeter or the corresponding board tools to check whether the alternator generates the nominal voltage indicated on the "nameplate" of the alternator.

9.5.7 Verification and replacement of voltage regulator

Type of intervention	Operator	Periodicity
PPE to wear		**Materials and equipments**
		Workshop tools.

Danger

Disconnect the alternator from the power supplies. The drive motor must be off and unplugged from its power supplies.

The alternators are equipped with an automated voltage regulator: the electronic regulators may be of 2 types: DSR, DER1.
The standard supply comes with the DSR.

DER1 can be mounted on customer request.

In case there are voltage regulation problems not ascribable to an erroneous adjustment of the VOLT, STAB, Hz and AMP potentiometers and/or to the system (fully assembled machine + load), follow the procedure below for an in-depth check of the voltage regulator.

Visual Inspection of the Regulator

Do not change the position of the VOLT, STAB, Hz and AMP potentiometers before marking their position.

In particular check for:

- Mechanical damages of various kinds.
- State of fuses.
- Undamaged state of electrical connections.
- Potential presence of burned electrical components.
- Presence of the silicone protection in the Hz and AMP potentiometers.

Check the SCR resistance and flyback diode.

Before doing this test, check that the fuse is inserted and undamaged.

- Flyback diode: it is working if the diode test performed between pin 1 and 2 has a positive result.
- SCR: it is working if a resistance of some hundred KΩ is measured between pin 1 and 8 (in the DSR) or between pin 1 and 2 (in the DER1 regulator).

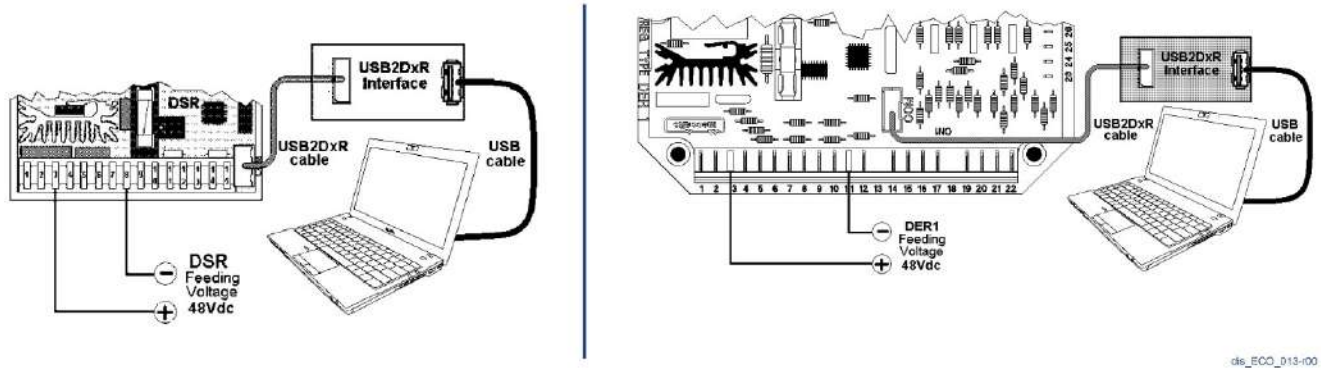
A resistance measure close to zero signals a SCR failure.
A reason for the damaging of these components may be the erroneous cabling of the alternator regulator.

Copy the data and alarms of the regulator.

To avoid creating new alarms, the copy of the data and alarms existing in the regulator (.dat and .alr files) must be made feeding the alternator with an appropriate continuous voltage, in accordance with the diagrams below.

The correct supply and operation of the software are signaled by a green LED flashing with a 1 second period. If the LED is not lit try to turn the power supply system off and restart it.

Testing on static bench (see paragraph 9.5.11, 9.5.12, and 9.5.13)



- Register the position of the VOLT, STAB, Hz and AMP potentiometers reading the L[32], L[33], L[34] and L [35] corresponding parameters and the state parameters, reading L[36], L[37], L[38] and L[39].
- Check the correct operation of the VOLT, STAB, Hz and AMP potentiometers, rotate them completely in anticlockwise and clockwise direction, the value of the L[32], L[33], L[34] and L[35] parameters must be 64 in one direction and 32760 in the other direction.
- Register the L[41] parameter; with the external potentiometer unconnected you should read a value of 16384; otherwise the external potentiometer circuit is damaged.
- Voltage regulation test: set the VOLT, STAB and Hz potentiometers to notch 6 then rotate the AMP potentiometer completely in clockwise direction. Read the L[43] and L[44] parameters.

When rotating the VOLT potentiometer in anticlockwise or in clockwise direction, the value of the L[43] parameter should respectively decrease or increase.

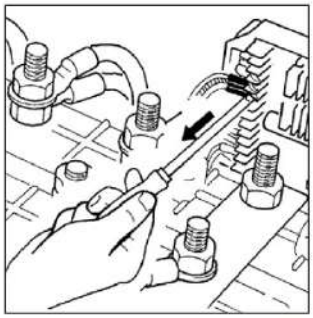
Check and confirm the following behavior: if the L[43] value is higher than the L[44] value, the bench light bulb should brighten. If instead the L[43] value is lower than the L[44] value, the light bulb should dim until it shuts off.

The light bulb represents the fictitious load connected between connectors 1 and 2 of the digital regulator.

- AMP protection test: set the STAB and Hz potentiometers to notch 6, then rotate the AMP potentiometer completely in clockwise direction; then rotate the VOLT potentiometer so as to have L[43] higher than L[44], the bench light bulb on and no active alarm.

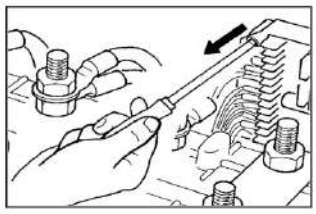
Read the L[45] parameter and set the AMP potentiometer (reading the L[35] parameter for the SN equipped regulators with a yellow tag, or L[55] for the SN-equipped regulators with a blue tag, to a lower value than the value of the previously read L[45] parameter. Check the intervention of the AMP protection (alarm 5).

Once you established that the regulator must be replaced, proceed as follows:



ins_ECO_004-r00

- Disconnect all the connection wires in the terminal block.
- Unscrew the blocking 2/4 screws of the regulator.



ins_ECO_005-r00

- Place the new regulator in the specified position.
- Fasten the new regulator with the previously collected screws.
- Reconnect all the wires to the terminal block of the regulator, using, if necessary, the diagrams provided by Mecc Alte.

In case you detect anomalous behavior please refer to the specific regulator manual or contact Mecc Alte's technical support service

9.5.8 DSR test and setup on test bench

Type of intervention	Operator	Periodicity

PPE to wear	Materials and equipments
	Personal computer+interface+software .

Danger

Disconnect the alternator from the power supplies. The drive motor must be off and unplugged from its power supplies. Disconnect the regulator and connect to a computer according to the diagrams below. The operations of functional checkout and parameter setting may be easier if they are performed on a test bench rather than with the regulator still inside the terminal box.

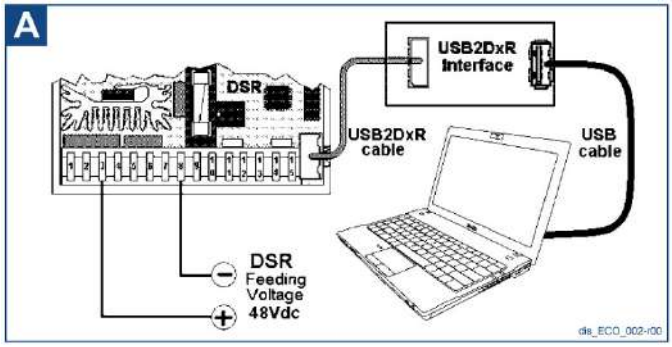
Caution

Given that some parts of the DSR which work with a high potential are not isolated, for the safety of the operator, it is necessary for the power source to be isolated from the electrical grid, for instance by a transformer.

Caution

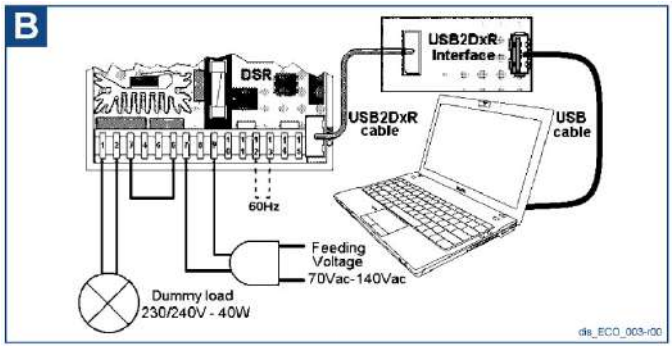
The use of these types of connection is reserved to qualified personnel, able to assess the operational risks of high voltage and who have a full knowledge of the content of this manual.

The connection diagrams of the DSR and the USB2DxR communication interface are shown in figures (A), (B) or (C) in this paragraph based on the requested function and on the available supply voltage.



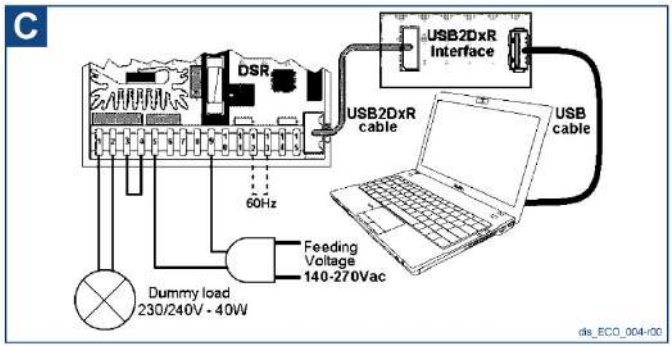
DSR 48Vdc power supply for the download of the alarms without risking to change to content of the EEPROM because of the tests.

No other connections besides the power supply are needed.



DSR 70-140Vac power supply for test and setup.

The fictitious load between terminals 1 and 2, the sensing on terminal 7 and the bridge between terminals 6 and 3 of the DSR.



DSR 140-140Vac power supply for test and setup.

The fictitious load between terminals 1 and 2, the sensing on terminal 5 and the bridge between terminals 3 and 4 of the DSR.

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9.5.9 DER1 test and setup on test bench

Type of intervention	Operator	Periodicity

PPE to wear	Materials and equipments
	Personal computer+interface+software .

Danger

Disconnect the alternator from the power supplies. The drive motor must be off and unplugged from its power supplies. Disconnect the regulator and connect to a computer according to the diagrams below. The operations of functional checkout and parameter setting may be easier if they are performed on a test bench rather than with the regulator still inside the terminal box.

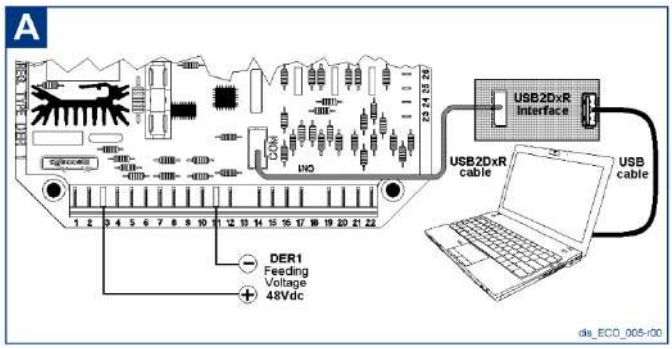
Caution

Given that some parts of the DER1 which work with a high potential are not isolated, for the safety of the operator, it is necessary for the power source to be isolated from the electrical grid, for instance by a transformer.

Caution

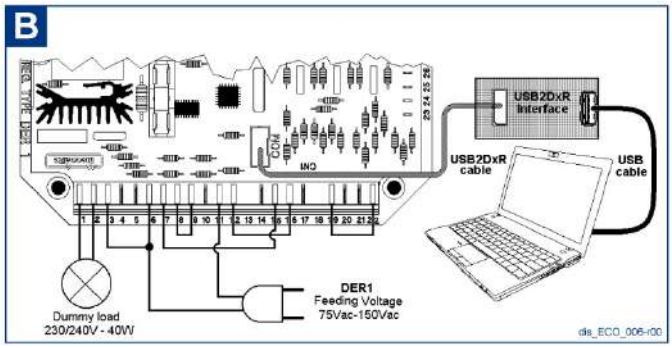
The use of these types of connection is reserved to qualified personnel, able to assess the operational risks of high voltage and who have a full knowledge of the content of this manual.

The connection diagrams of the DER1 and the USB2DxR communication interface are shown in figures (A), (B) or (C) in this paragraph based on the type of available power supplies.



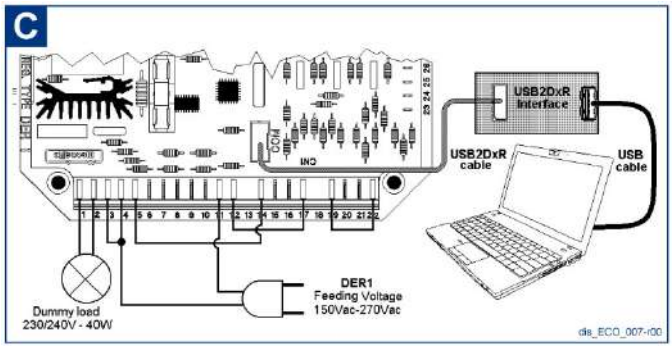
DER1 48Vdc power supply for the download of the alarms without risking to change to content of the EEPROM because of the tests.

No other connections besides the power supply are needed.



DER1 75-150Vac power supply for test and setup.

The fictitious load between terminals 1 and 2, the sensing on terminal 6 and the bridge between terminals 8 and 9, 7 and 15, 12 and 16, 19 and 22.

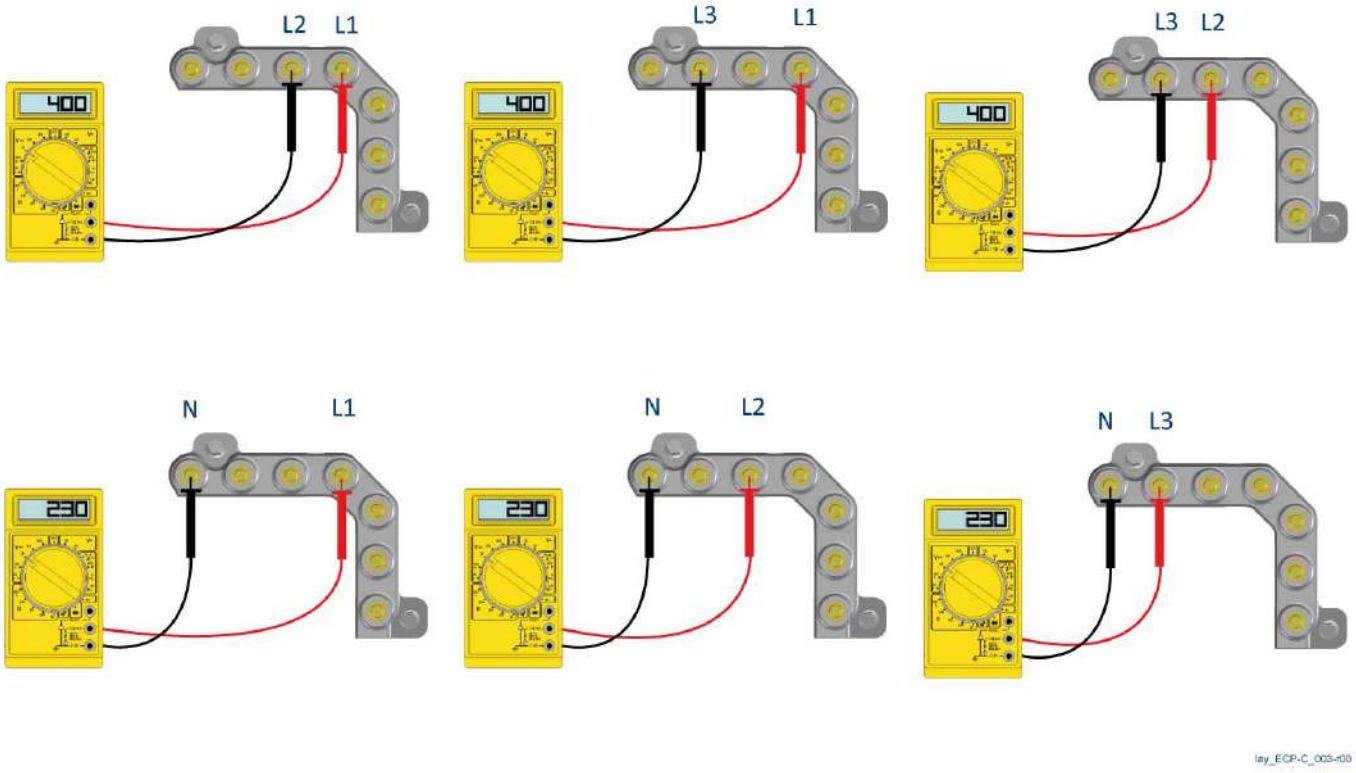


DER1 150-270Vac power supply for test and setup.

The fictitious load between terminals 1 and 2, the sensing on terminal 4 and the bridge between terminals 5 and 14, 12 and 17, 19 and 22.

9.5.10 Main stator windings voltage test

Type of intervention	Operator	Periodicity
PPE to wear		**Materials and equipments**
		Electrical tools.



Use a multimeter to check all three phases (both L-L and L-N).
When off-load the voltage should be balanced on all three phases with a ± 1% tolerance.
If the voltage is unbalanced, this indicates a problem in the main winding of the stator.
If instead the voltage is balanced on the three phases, then the winding of the stator does not have problems.
If the voltage is lower than 15% of the nominal voltage, there might be a problem with the regulator, in the rotating diode bridge or in the exciter winding.

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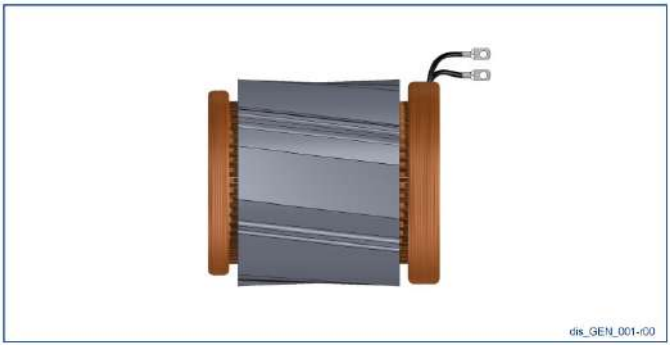
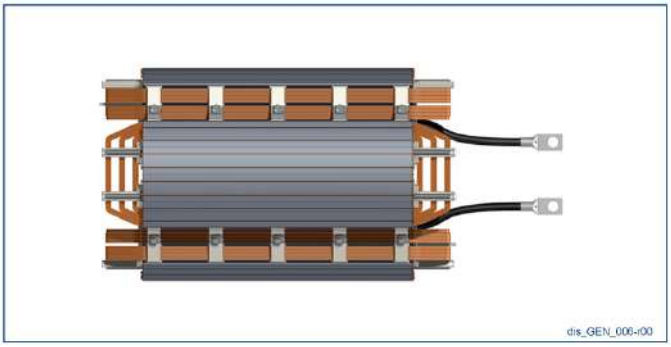
9.5.10.1 Resistance/Continuity Test



Main Stator

Use an appropriate tool to measure the phase resistance/continuity 1-2, 3-4, 5-6, 7-8, 9-10 and 11-12
Also check the resistance/continuity of the auxiliary winding between the two red wires coming out of the main stator.

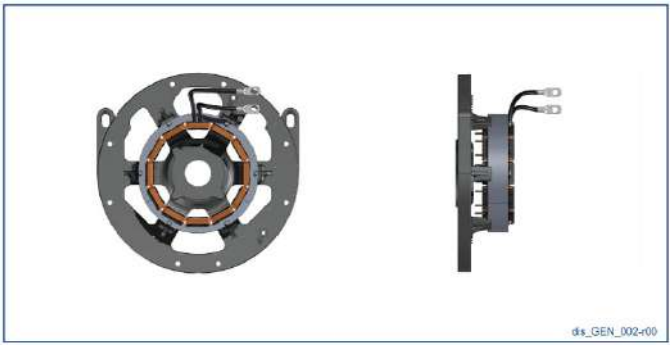
For the values see paragraph 2.3.8



Main rotor

Measure the resistance/continuity of the main rotor using a multimeter.

For the values see paragraph 2.3.8



Exciter stator

Measure the resistance/continuity of the winding of the exciter stator between the positive wire (yellow) and the negative one (blue) with a multimeter.

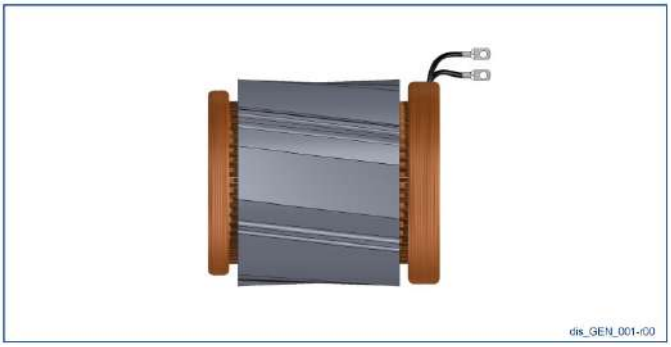
For the values see paragraph 2.3.8

Exciter rotor

Measure the resistance/continuity of the winding of the exciter rotor between phases with a multimeter.

For the values see paragraph 2.3.8

9.5.10.2 Insulation Test



Main Stator

Completely disconnect the AVR and the connection between neutral and ground before performing this test.

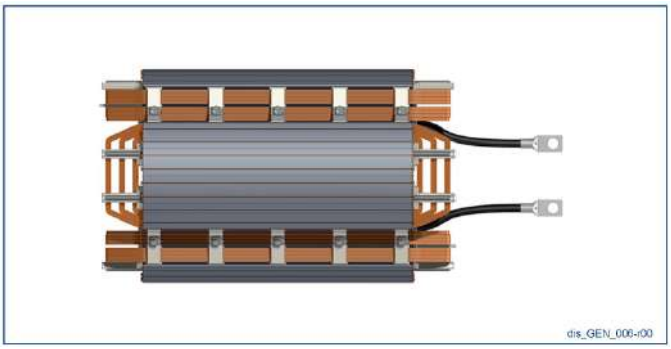
The measurement must be carried out using an insulation tester (Megger) of 500 V.

Check the insulation between phases, between phases and ground, between auxiliary and phases and between auxiliary and ground.

For these alternators, the minimum insulation value is of 5 MΩ.

If the insulation resistance is lower, the stator must be cleaned and, if necessary, impregnated or painted again with EG43 gray paint and then dried at 50-60 °C.

If after these operations the value remains low, the stator must be rewound or replaced.



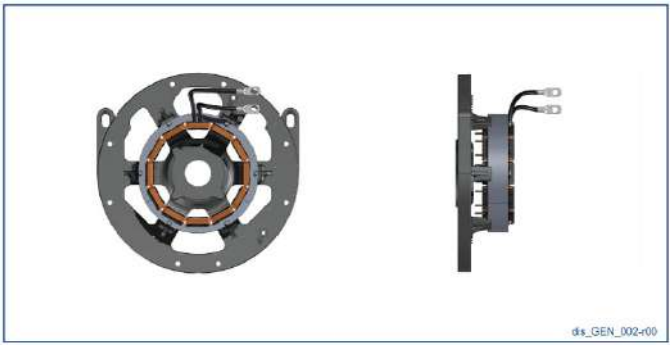
Main rotor

The insulation resistance is measured between phase and ground using an insulation tester (Megger).

For these alternators, the minimum insulation value is of 5 MΩ.

If the insulation resistance is lower, the rotor must be cleaned and, if necessary, impregnated and then dried at 50-60 °C.

If after these operations the value remains low, the rotor must be rewound or replaced.



Exciter stator

The insulation resistance is measured between phase and ground using an insulation tester (Megger).

For these alternators, the minimum insulation value is of 5 MΩ.

If the insulation resistance is lower, the stator must be cleaned and, if necessary, painted again with EG43 gray paint and then dried at 50-60 °C.

If after these operations the value remains low, then the stator must be rewound or replaced.

Exciter rotor

The insulation resistance is measured between phase and ground using an insulation tester (Megger).

For these alternators, the minimum insulation value is of 5 MΩ.

If the insulation resistance is lower, the rotor must be cleaned and, if necessary, impregnated and then dried at 50-60 °C.

If after these operations the value remains low, the rotor must be rewound or replaced.

9.6 General Tightening Torques

9.6.1 ECP4 C Series

Application		Screw type		[Nm] ± 7% Tightening Torque	Replacement parts cat. reference
Cover tie rod	M	M8 X 335		21	8
	L	M8 X 402		21	
Fastening of 30 mm exciter stator		M6 X 80	CL. 8.8	7	7
IP2X protection of front cover		M5 X 25	CL. 4.8	3.3	/
Rear Grid		M6 X 16	CL. 6.8	9	/
Terminal Board		M6 X 16	CL. 8.8	9	/
Fastening the terminal block to the frame		M6 X 16	CL. 8.8	2.5	/
Closed side panel fixing		M6 X 25	CL. 8.8	2.5	/
Regulator side panel fixing		M6 X 25	CL. 8.8	6	/
Regulator plug fixing		M6 X 10	CL. 8.8	6	/
Teminal box cover fixing		M6 X 16	CL. 8.8	9	/
Ground terminal on the frame		M6 X 16	CL. 8.8	9	/
Ground terminal on the cover		M6 X 25	CL. 8.8	9	/
Clamp for fan fastening		M8 X 30	CL. 8.8	12.5	17
Regulator		M4 X 25	CL. 4.8	1.5	/
Flywheel					
Flywheel 6.5		M8 X 25	CL. 8.8	25	14
Flywheel 7.5		M8 X 25	CL. 8.8	25	14
Flywheel 8		M8 X 55	CL. 8.8	25	14
Flywheel 10		M8 x 50	CL. 8.8	25	14
Flywheel 11.5		M8 x 35	CL. 8.8	25	14

Optional				
Parallel device fastening	M5 X 12	CL. 4.8	1.5	/
Terminal board for parallel device	M3 X 16	CL. 8.8	1.5	/
Terminal board for accessories	M3 X 20	CL. 4.8	0.5	/
Spacing insulator	M6 X 10	CL. 4.8	7	/

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9.6.2 ECP28 C Series

Application		Screw type		[Nm] ± 7% Tightening Torque	Replacement parts cat. reference
Cover tie rod	VS	M8 X 299		21	8
	S	M8 X 338		21	
	M	M8 X 358		21	
	L	M8 X 393		21	
	VL	M8 X 438		21	
Fastening of 35 mm exciter stator		M6 X 95	CL. 8.8	9	7
IP2X protection of front cover		M5 X 10	CL. 4.8	3.3	9
Rear Grid		M6 X 16	CL. 8.8	9	1
Terminal Board		M6 X 16	CL. 8.8	9	/
Fastening the terminal block to the frame		M6 X 16	CL. 8.8	9	/
Closed side panel fixing		M6 X 16	CL. 8.8	9	/
Regulator side panel fixing		M6 X 16	CL. 8.8	9	/
Regulator plug fixing		M6 X 10	CL. 8.8	6	/
Teminal box cover fixing		M6 X 16	CL. 8.8	9	/
Ground terminal on the frame		M6 X 16	CL. 8.8	9	/
Ground terminal on the foot		M6 X 25	CL. 8.8	9	/
Clamp for fan fastening		M8 X 30	CL. 8.8	12.5	16
Regulator		M4 X 25	CL. 4.8	1.5	/
Flywheel					
Flywheel 6.5		M10 X 30	CL. 8.8	48	14
Flywheel 7.5		M10 X 30	CL. 8.8	48	14
Flywheel 8		M10 X 30	CL. 8.8	48	14
Flywheel 8		M12 X 30	CL. 8.8	80	14
Flywheel 10		M10 X 30	CL. 8.8	48	14
Flywheel 10		M12 X 30	CL. 8.8	80	14
Flywheel 11.5		M10 X 40	CL. 8.8	48	14

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Optional				
Parallel device fastening	M4 X 10	CL. 4.8	1.5	/
Terminal board for parallel device	M4 X 25	CL. 4.8	0.5	/
Terminal board for accessories	M3 X 20	CL. 4.8	0.5	/
Spacing insulator	M6 X 10	CL. 4.8	7	/

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9.6.3 ECP30 C Series

Application		Screw type		[Nm] ± 7% Tightening Torque	Replacement parts cat. reference
Cover tie rod	M	M8 X 398		17	8
	L	M8 X 460		17	
Fastening of 35 mm exciter stator		M6 X 95	CL. 8.8	9	7
IP2X protection of front cover		M5 X 25	CL. 4.8	3.3	/
Rear Grid		M6 X 16	CL. 8.8	9	/
Terminal Board		M6 X 16	CL. 8.8	9	/
Fastening the terminal block to the frame		M6 X 16	CL. 8.8	9	/
Closed side panel fixing		M6 X 16	CL. 8.8	9	/
Regulator side panel fixing		M6 X 16	CL. 8.8	9	/
Regulator plug fixing		M6 X 10	CL. 8.8	6	/
Teminal box cover fixing		M6 X 16	CL. 8.8	9	/
Ground terminal on the frame		M6 X 16	CL. 8.8	9	/
Ground terminal on the foot		M6 X 25	CL. 8.8	9	/
Clamp for fan fastening		M8 X 30	CL. 8.8	12.5	16
Regulator		M4 X 25	CL. 4.8	1.5	/
Flywheel					
Flywheel 6.5		M10 X 30	CL. 8.8	48	14
Flywheel 7.5		M10 X 30	CL. 8.8	48	14
Flywheel 8		M10 X 30	CL. 8.8	48	14
Flywheel 8		M12 X 30	CL. 8.8	80	14
Flywheel 10		M10 X 30	CL. 8.8	48	14
Flywheel 10		M12 X 30	CL. 8.8	80	14
Flywheel 11.5		M10 X 40	CL. 8.8	48	14

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Optional				
Parallel device fastening	M4 X 10	CL. 4.8	1.5	/
Terminal board for parallel device	M4 X 25	CL. 4.8	0.5	/
Terminal board for accessories	M3 X 20	CL. 4.8	0.5	/
Spacing insulator	M6 X 10	CL. 4.8	7	/

9.6.4 ECP32 C Series

Application		Screw type		[Nm] ± 7% Tightening Torque	Replacement parts cat. reference
Cover tie rod	S/2	M10 X 438		34	8
	S/4	M10 X 427		34	
	M/4	M10 X 492		34	
	L/2-4	M10 X 573		34	
Fastening of 45 mm exciter stator (S/M)		M6 X 122	CL. 6.8	9	7
IP2X protection of front cover		M5 X 25	CL. 4.8	3.3	/
Rear Grid		M6 X 16	CL. 8.8	9	/
Terminal board		M6 X 20	CL. 8.8	6	/
Fastening the terminal box to the frame		M6 X 16	CL. 8.8	9	/
Terminal box		M5 X 12	CL. 8.8	3.5	/
Regulator support fastening		M5 X 12	CL. 8.8	3.5	/
Frame ground		M6 X 16	CL. 8.8	9	/
Foot ground		M6 X 16	CL. 4-S	9	/
Rotor V-square (for 4 pole only)		M5 X 35	CL. 8.8	3.5	/
Clamp for fan fastening		M8 X 30	CL. 8.8	12.5	16
Regulator		M4 X 20	CL. 4.8	1.5	/
Flywheel					
Flywheel 6.5		M12 X 35	CL. 12.9	140 ± 10%	14
Flywheel 7.5		M12 X 35	CL. 12.9	140 ± 10%	14
Flywheel 8		M12 X 35	CL. 12.9	140 ± 10%	14
Flywheel 8		M12 X 30	CL. 8.8	80	14
Flywheel 10		M12 X 35	CL. 12.9	140 ± 10%	14
Flywheel 10		M12 X 30	CL. 8.8	80	14
Flywheel 11.5		M12 X 40	CL. 12.9	140 ± 10%	14

Optional				
Parallel device fastening	M4 X 10	CL. 4.8	1.5	/
Terminal board for parallel device	M3 X 16	CL. 4.8	0.5	/
Terminal board for accessories	M3 X 16	CL. 4.8	0.5	/
Spacing insulator	M8 X 12	CL. 4.8	21	/
Noise filter radio	M4 X 20	CL. 4.8	1.5	/
Front air filter IP45	M5 X 16	CL. 8.8	3.5	/
	M6 X 30	CL. 8.8	9	/
Rear air filter IP45	M6 X 14	CL. 8.8	9	/

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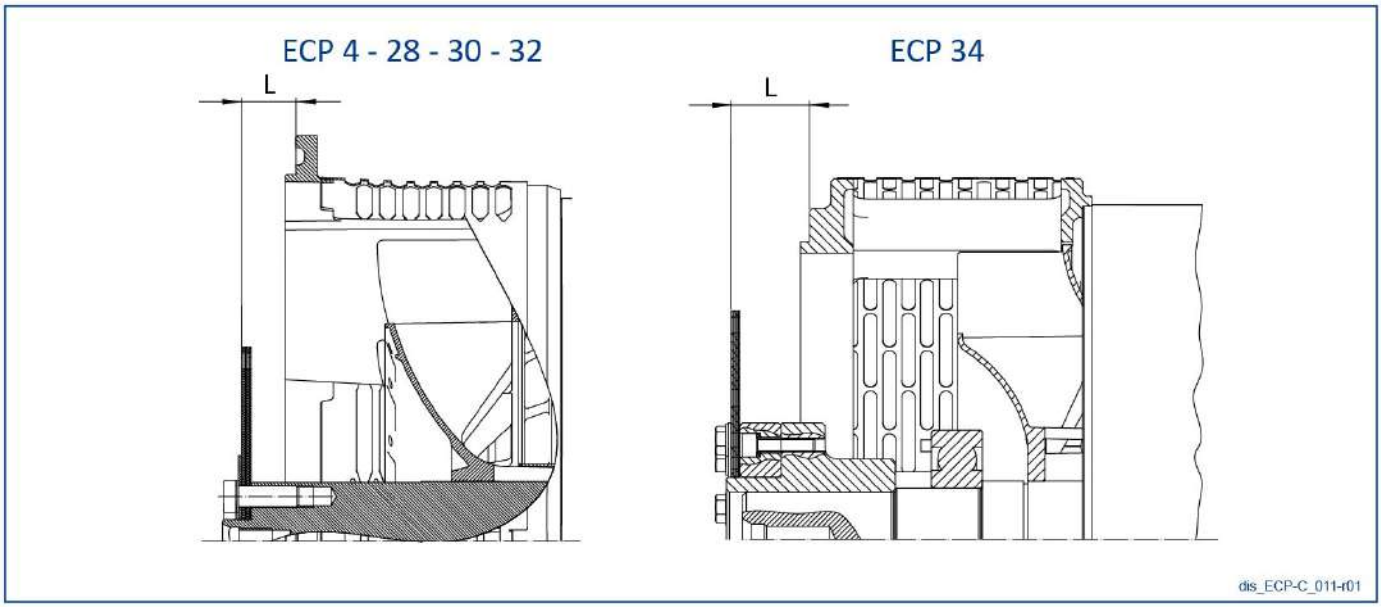
9.6.5 ECP34 C Series

Application	Screw type		[Nm] ± 7% Tightening Torque	Replacement parts cat. reference
Cover tie rod S	M14 X 540		120 ± 10%	8
Cover tie rod M	M14 X 580		120 ± 10%	8
Cover tie rod L	M14 X 635		120 ± 10%	8
Fastening of 55 mm exciter stator	M8 X 140		25	7
IP2X protection of front cover	M5 X 25	CL. 4.8	3.3	/
Rear cover	M6 X 16	CL. 8.8	9	/
Terminal board	M8 X 20	CL. 8.8	21	/
Fastening the terminal box to the frame	M6 X 16	CL. 8.8	9	/
Terminal box	M6 X 16	CL. 8.8	9	/
Regulator plug with screwdriver	M6 X 10	CL. 8.8	9	/
Ground terminal on the frame	M6 X 16	CL. 8.8	9	/
Ground terminal on the foot	M8 X 25	CL. 8.8	21	/
Fan fastening	M8 X 30	CL. 8.8	12.5	16
Regulator	M4 X 25	CL. 4.8	1.5	/
Flywheel				
Flywheel 10	M10 X 30	CL. 8.8	48	14
Flywheel 11.5	M10 X 45	CL. 8.8	48	14
Flywheel 14	M10 X 30	CL. 8.8	48	14
Optional				
Parallel device fastening	M4 X 16	CL. 4.8	1.5	/
Terminal board for parallel device	M4 X 25	CL. 4.8	1.5	/
Terminal board for accessories	M3 X 20	CL. 4.8	0.5	/
Spacing isolator	M6 X 16	CL. 8.8	7	/
Terminal board for optional	M6 X 16	CL. 4.8	9	/
Jumper for PTS	M5 X 16		1.7	/
	M5 X 12		1.7	/

9.7 Disc Tightening Torques

In case of replacement of discs, the appropriate tightening torques are indicated here (fastening discs to hub).



Type	SAE	L	Screw size		Tightening Torques (Nm)	
			TE	TCCEI	CL. 8.8	CL. 12.9
ECP4	6 ½	30.2	/	M8x25-8.8	25 ± 7%	/
	7 ½	30.2	/	M8x25-8.8	25 ± 7%	/
	8	62	/	M8x55-8.8	25 ± 7%	/
	10	53.8	/	M8x50-8.8	25 ± 7%	/
	11 ½	39.6	/	M8x35-8.8	25 ± 7%	/
ECP28	6 ½	30.2	M10x30-8.8	/	48 ± 7%	/
	7 ½	30.2	M10x30-8.8	/	48 ± 7%	/
	8	62	M12x30-8.8	M10x30-8.8	80-48 ± 7%	/
	10	53.8	M12x30-8.8	M10x30-8.8	80-48 ± 7%	/
	11 ½	39.6	M10x40-8.8	/	48 ± 7%	/
ECP30	6 ½	30.2	M10x30-8.8	/	48 ± 7%	/
	7 ½	30.2	M10x30-8.8	/	48 ± 7%	/
	8	62	M12x30-8.8	M10x30-8.8	80-48 ± 7%	/
	10	53.8	M12x30-8.8	M10x30-8.8	80-48 ± 7%	/
	11 ½	39.6	M10x40-8.8	/	48 ± 7%	/
ECP32	6 ½	30.2	/	M12x40-12.9	/	140 ± 10%
	7 ½	30.2	/	M12x40-12.9	/	140 ± 10%
	8	62	M12x30-8.8	M12x40-12.9	80 ± 7%	140 ± 10%
	10	53.8	M12x30-8.8	M12x40-12.9	80 ± 7%	140 ± 10%
	11 ½	39.6	/	M12x40-12.9	/	140 ± 10%
ECP34	10	53.8	M10x30-8.8	M10x40-8.8	48 ± 7%	/
	11 ½	39.6	M10x45-8.8	/	48 ± 7%	/

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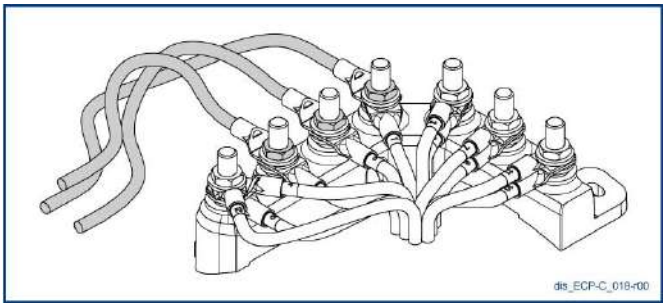
	14	25.4	M10x30-8.8	/	48 ± 7%	/

9.8 Terminal block Tightening Torques



THREAD DIAMETER Df	TYPE	TIGHTENING TORQUE (Nm)
M6	ECP28	6 ± 7%
M8	ECP32	9 ± 7%
M12	ECP34	21 ± 7%

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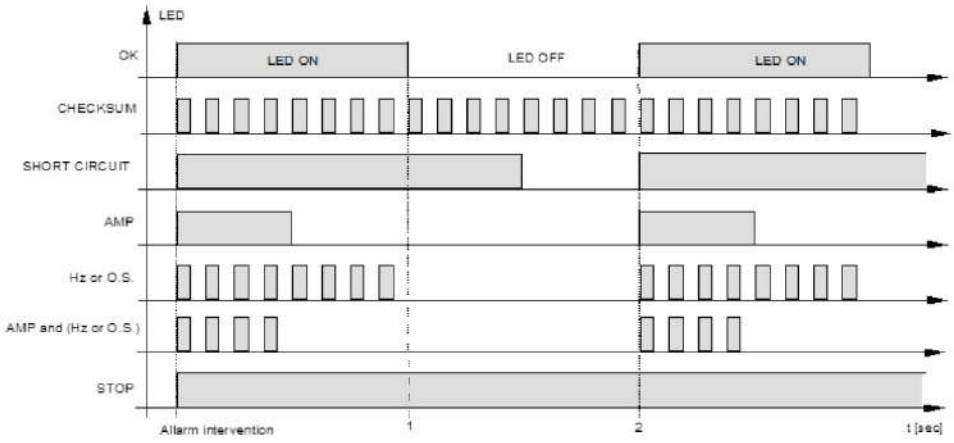
10 DSR / DER1 alarm management

The state of the active alarms is visualized at location 38 that may be read through USB.
The index of the bits that present value 1 correspond to an active alarm.
If the regulator is working regularly (no active alarm) the B11 bit will result active.

N.	Event description	Action
1	EEprom Checksum	Restoring default data, Block
2	Overvoltage	APO
3	Undervoltage	APO
4	Short circuit	APO, Maximum current, Block
5	Excitation Overcurrent	APO, Reduction of Excitation Current
6	Low speed	APO, V/F Ramp
7	Overspeed	APO
8	Underexcitation /loss of excitation	APO

During normal operation a LED indicator mounted on the card flashes with a 2 second period and 50% duty cycle.
In case of intervention or signaling of any alarm there are different flashing modes available, as shown in the figure below.



dis_ECO_012-r00

10.1 DSR/DER1 digital regulator alarms

ALARM DESCRIPTION		
N.	**Event description**	**Action**
1	Erroneous EEPROM control code	It is checked on start (after the DSP reset and the launch of the peripheral devices). The actions taken are: signaling, loading default settings, saving in EEPROM and blocking the regulator. Upon restart, if EEPROM is faulty, the alarm will be repeated, otherwise the regulator will start to operate on default parameters.
2	Overvoltage	The alarm does not determine a change in the LED flash, enables APO output and is memorized. It may be caused either by anomalous operating conditions (such as overspeed or capacitive load) or by any fault in the regulator. The overvoltage alarm is activated only if the angle has already been reduced to zero and, therefore, output voltage control has been lost. Overvoltage is calculated using an appropriate window, based on the speed and it is inhibited during the transients, for 2 sec. In the calculation window the threshold is set to 5% above the nominal value.
3	Undervoltage (@ ωN)	The alarm does not determine a change in the LED flash, enables APO output and is memorized. Undervoltage is calculated using an appropriate window based on the speed (visible in the undervoltage alarm description), the threshold is set to 5% under the nominal value; it intervenes only above the intervention threshold of the low speed alarm, it basically is inhibited by it. It is also inhibited in case of intervention of the "excitation overcurrent" alarm and during transients.
4	Short circuit	The alarm is disabled under 20Hz and visualized and memorized when action is activated. Tolerated short circuit time goes from 0.1 to 25,5 seconds (programmable in 100ms steps); then the regulator, after having saved DD and TT, turns to block mode and signals the STOP status. With the "short circuit time" parameter set to zero, the block is disabled. The reduction of the angle may cause an excitation drop, with a consequent stop and subsequent restart of the regulator and then the cycle is repeated.
5	Excitation Overcurrent	This alarm's function is not only to signal a state of excess accumulation of heating of the exciter, but also an active function of elimination of the cause. There is in fact a regulation ring that takes over after a threshold is exceeded; the action determines the reduction of the excitation current and then of the output voltage. The available parameter is the "threshold", which determines, in the end, the balance value at which the system stabilizes. The alarm is signaled and memorized. For the adjustment see paragraph "Excitation overcurrent".
6	Low speed	(Immediate) Signaling and activation of the V/F ramp. This alarm also appears at start and at stop. The alarm does not trigger data saving in EEPROM. The alarm intervention threshold depends on the 50/60 jumper status (hardware or software) and on the Hz trimmer position or on the value of parameter 21. Under the threshold the V/F ramp is present.

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ALARM DESCRIPTION		
N.	**Event description**	**Action**
7	Overspeed	It is visualized similarly to the low speed alarm, it does not trigger actions on control and it is memorized. The overspeed condition may cause, as in the case of capacitive load, an overvoltage. The threshold may be set through parameter 26.
8	Underexcitation /loss of excitation	The alarm does not determine a change in the LED flash, enables APO output and is memorized. The alarm condition is recognized by a underexcitation / loss of excitation observer, available for reading at location L[56]: if the value of L[56] is higher than the upper (fixed) threshold or lower than the value of the lower threshold (parameter P[27]), A-08 is activated. The alarm is inhibited during transients.

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11 Problems, causes and solutions

Defect	Cause	Remedies
The alternator does not excite.	Faulty fuse.	Check the fuse and if necessary replace it.
	Faulty diodes.	Check the diodes and if necessary replace them (see paragraph 9.5.2).
	Speed too low (lower than nominal speed).	Adjust the speed to the nominal value.
	Residual magnetism too low.	Apply for an instant to the "+" and "-" of the electronic regulator a voltage of 12V of a battery with in series a resistance of 30 ohms, respecting the polarities.
The alternator de-excites after excited state.	Connection cables damaged or disconnected.	Check the state and correct fastening of cables. Check the correct connection of cables using the attached drawings.
At no load low voltage	Regulator is not adjusted.	Readjust the voltage and/or stability. (see paragraph 8.1 and 8.2).
	Faulty regulator.	Replace the regulator.
	Speed lower than nominal speed.	Check the number of rotations.
	Damaged windings.	Check windings. (see paragraph 9.5.10).
At no load voltage is too high.	Regulator is not adjusted.	Readjust the voltage and/or stability (see paragraph 8.1 and 8.2).
	Faulty regulator.	Replace the regulator.
At load, voltage is lower than nominal voltage.	Regulator is not adjusted.	Readjust the voltage and/or stability (see paragraph 8.1 and 8.2).
	Faulty regulator.	Replace the regulator.
	Current is too high, cos ϕ lower than 0.8, speed lower than 4% nominal speed.	Operating outside the standard parameter range. Adjust the alternator back to standard parameters.
	Faulty diodes.	Check the diodes and if necessary replace them (see paragraph 9.5.2).
At load, voltage is higher than nominal voltage.	Regulator is not adjusted.	Readjust the voltage and/or stability (see paragraph 8.1 and 8.2).
	Regulator is not adjusted.	Replace the regulator.

Defect	Cause	Remedies
Unstable voltage.	Instability of the drive motor rotation speed.	Check uniformity of the drive motor rotation speed.
	"STAB" potentiometer of the regulator not adjusted.	Adjust stability of the regulator by turning the "STAB" potentiometer. (see paragraph 8.1.1 and 8.2.1).
Bearing high temperature	Damaged bearing.	Replace the bearing (see paragraph 9.5.3).
	Shaft Misalignment.	Check alignment (see paragraph 5.3.2 and 5.3.3).
Temperature of cooling air is high.	Ambient temperature is high.	Check the ventilation in the room to ensure correct temperature.
	Air backflow towards the machine.	Check for presence of obstructions around the machine.
	Aspiration of obstructed area.	Check the air vents.
	Heat source nearby the air vents.	Move heat source or machine.
	Air filter is clogged.	Clean or replace the air filter (see paragraph 9.3.2).
Vibration	Damaged bearings.	Replace bearings (see paragraph 9.5.3).
	Unbalancing/break of cooling fan.	Check/replace cooling fan (see paragraph 9.5.1).
	Inefficient base-attachment system.	Check attachment system.
	Misalignment between alternator and drive motor.	Check alignment between alternator and drive motor (see paragraph 5.3.2 and 5.3.3).

For any other anomaly please contact the reseller, in the authorized service centers or directly at Mecc Alte.

12 Electrical diagrams

Regulator type	Connection	Drawing No.
DSR	12 terminals - single-phase reference	SCC0062
DSR	12 terminals - single-phase reference	SCC0063
DSR	12 terminals - single-phase reference	SCC0064
DER1	12 terminals - single-phase reference	SCC0161
DER1	12 terminals - single-phase reference	SCC0160
DER1	12 terminals - three-phase reference	SCC0159
DER1	12 terminals - three-phase reference	SCC0158
DER1	12 terminals - single-phase reference	SCC0202
DER1	12 terminals - ZIG-ZAG connection, single-phase reference	SCC0203
SR7	6 terminals - single-phase reference	A2544
UVR6	6 terminals - single-phase reference	A2550
SR7	12 terminals - single-phase reference	A2545
UVR6	12 terminals - single-phase reference	A2549
UVR6	6 terminals - three-phase reference	A2548
UVR6	12 terminals - three-phase reference	A2552

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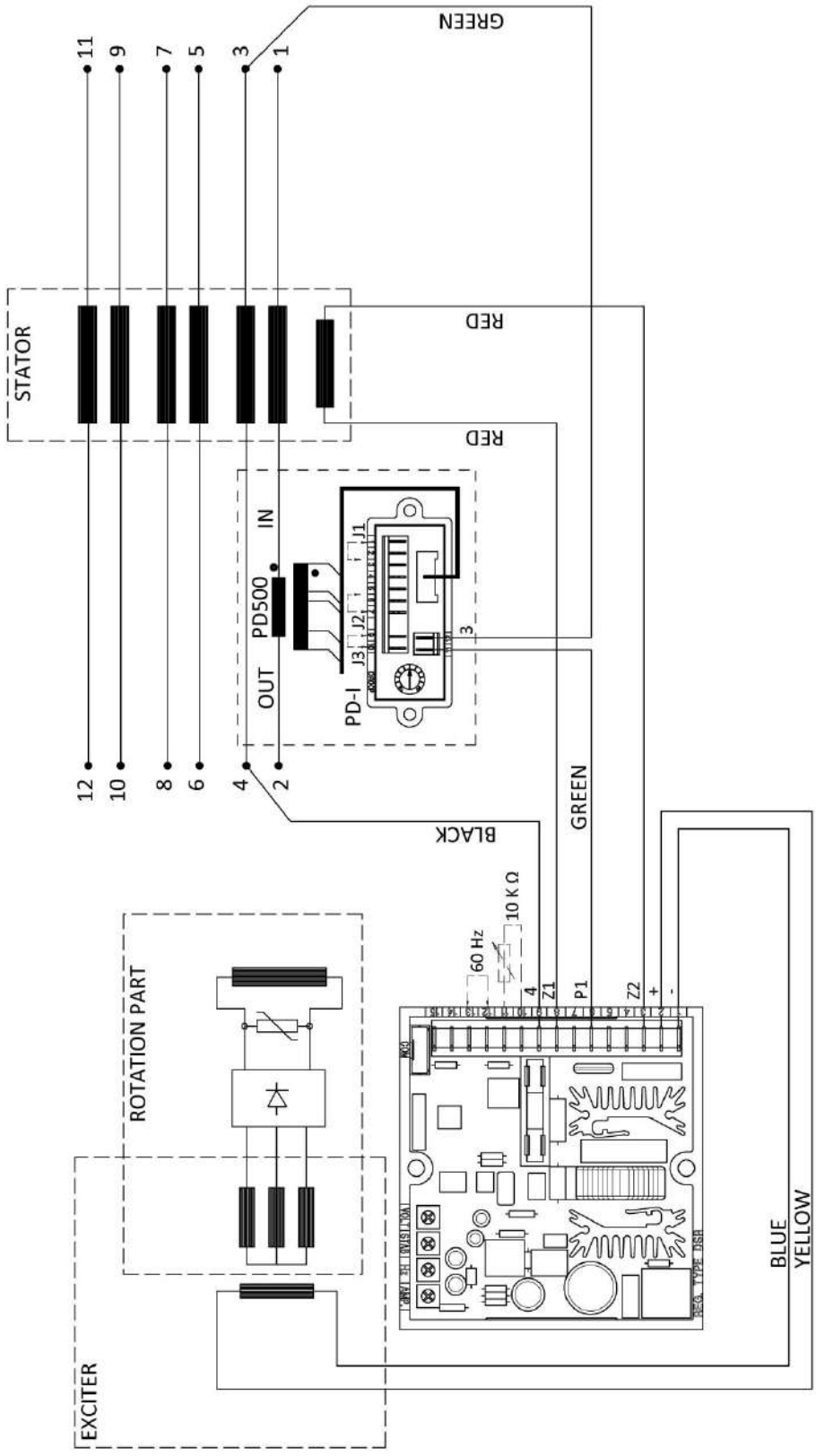
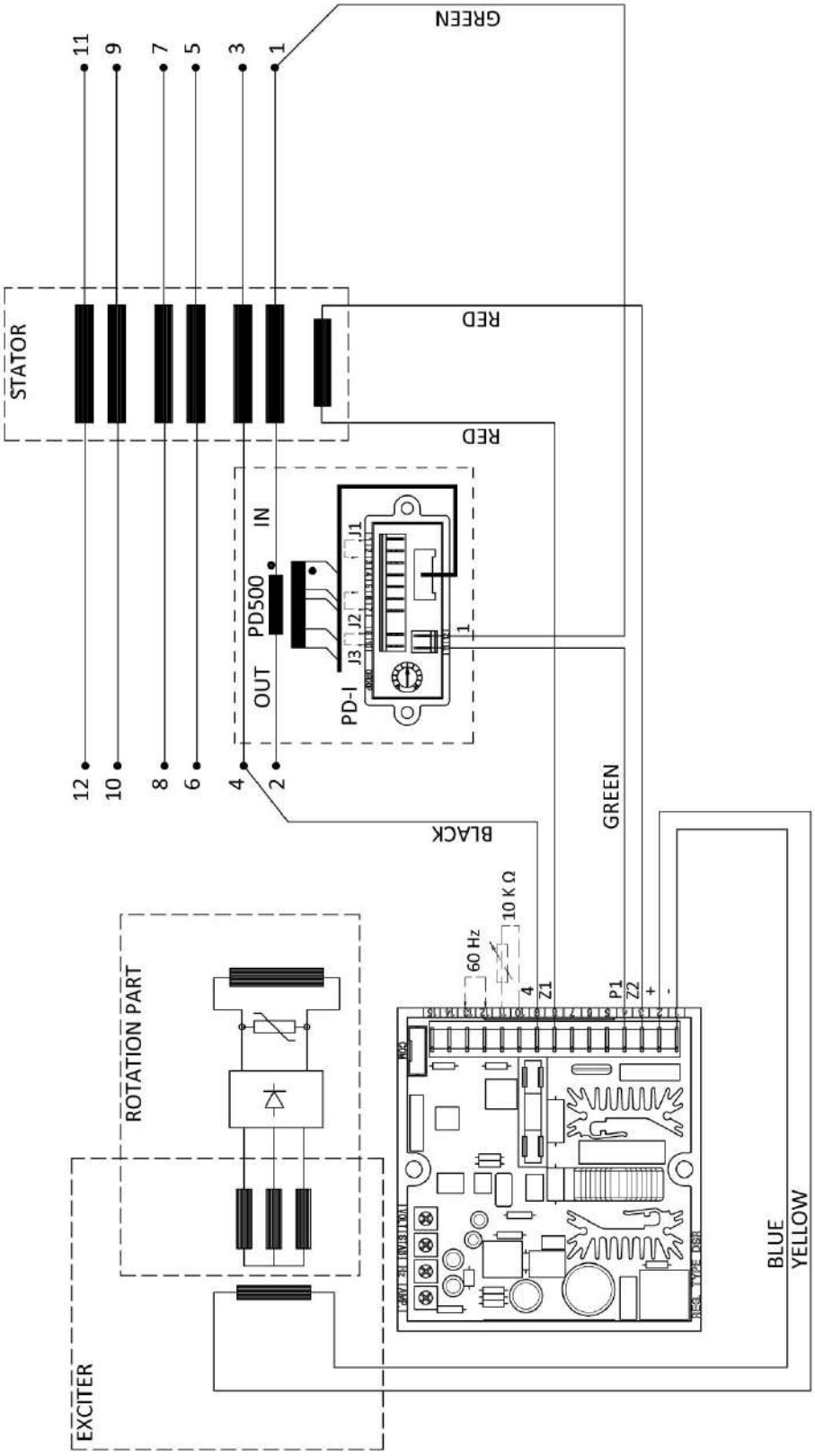
12.1 DSR digital regulator electrical diagrams

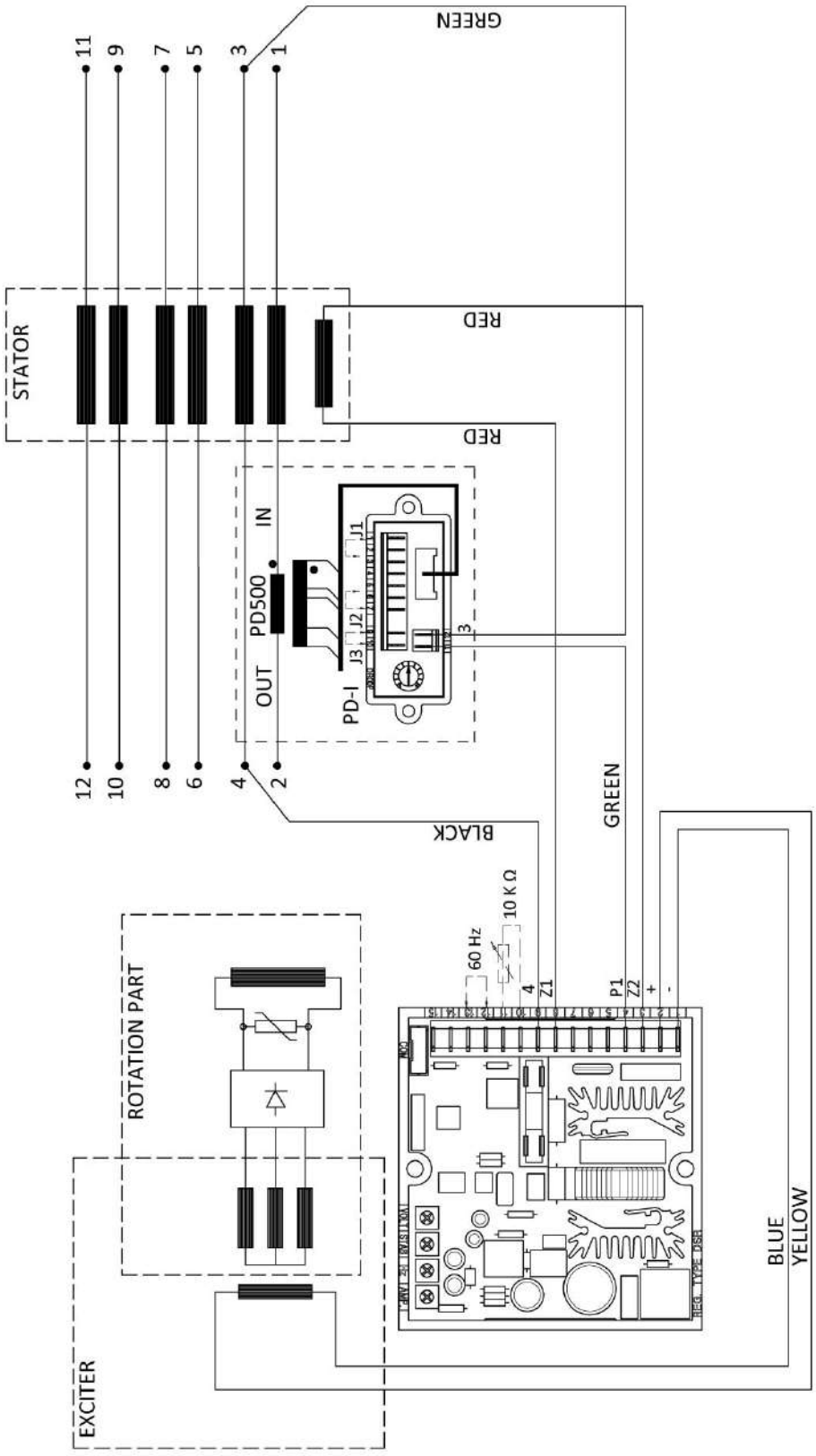
SCC0062: Alternators with 12 terminals with reference on half phase from 70 V to 140 V.



SCC0063: Alternators with 12 terminals for star or delta connections, reference on the entire phase from 140 V to 280 V.

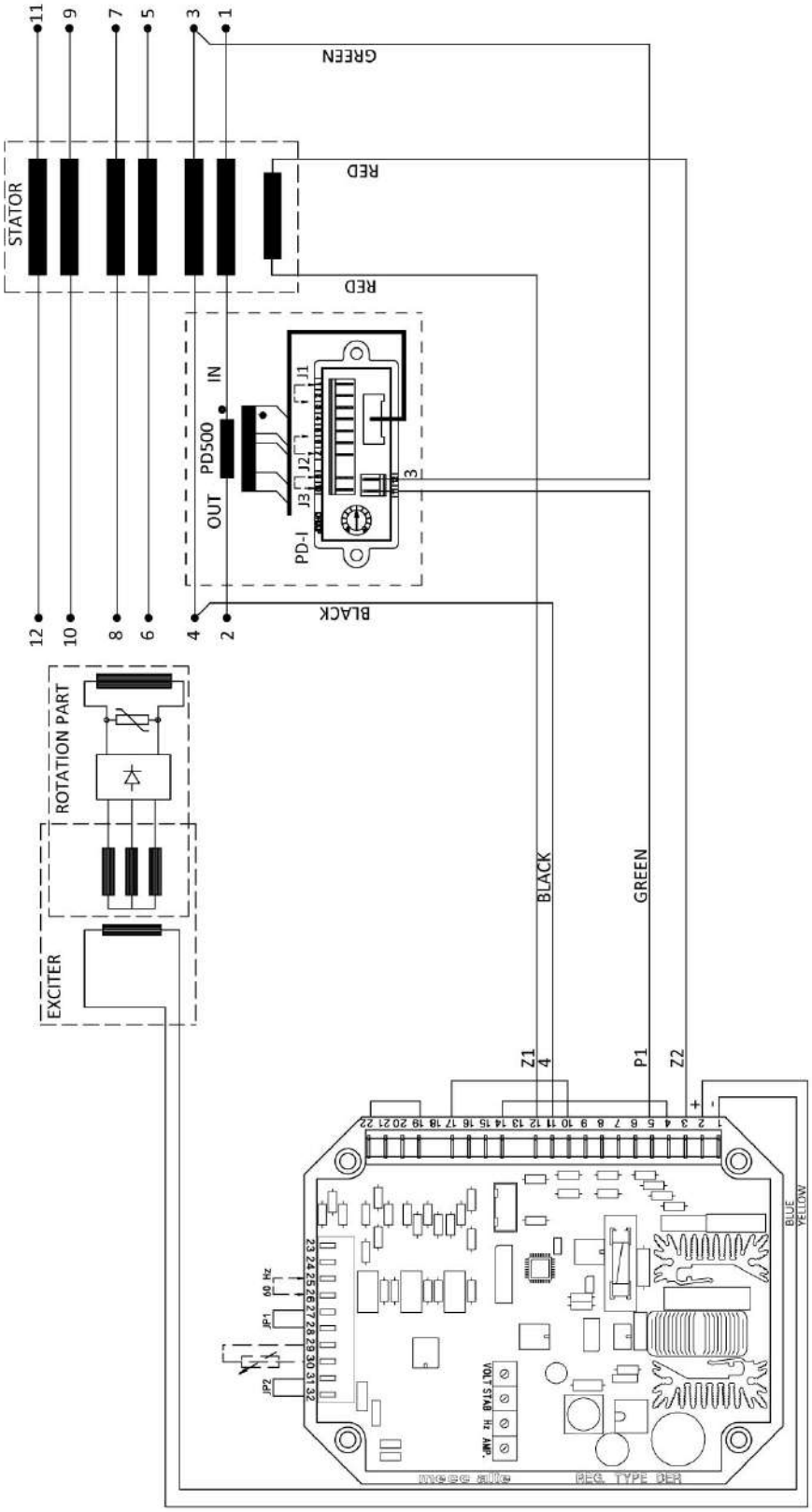


SCC0064: Alternators with 12 terminals with reference on half phase from 140 V to 280 V.

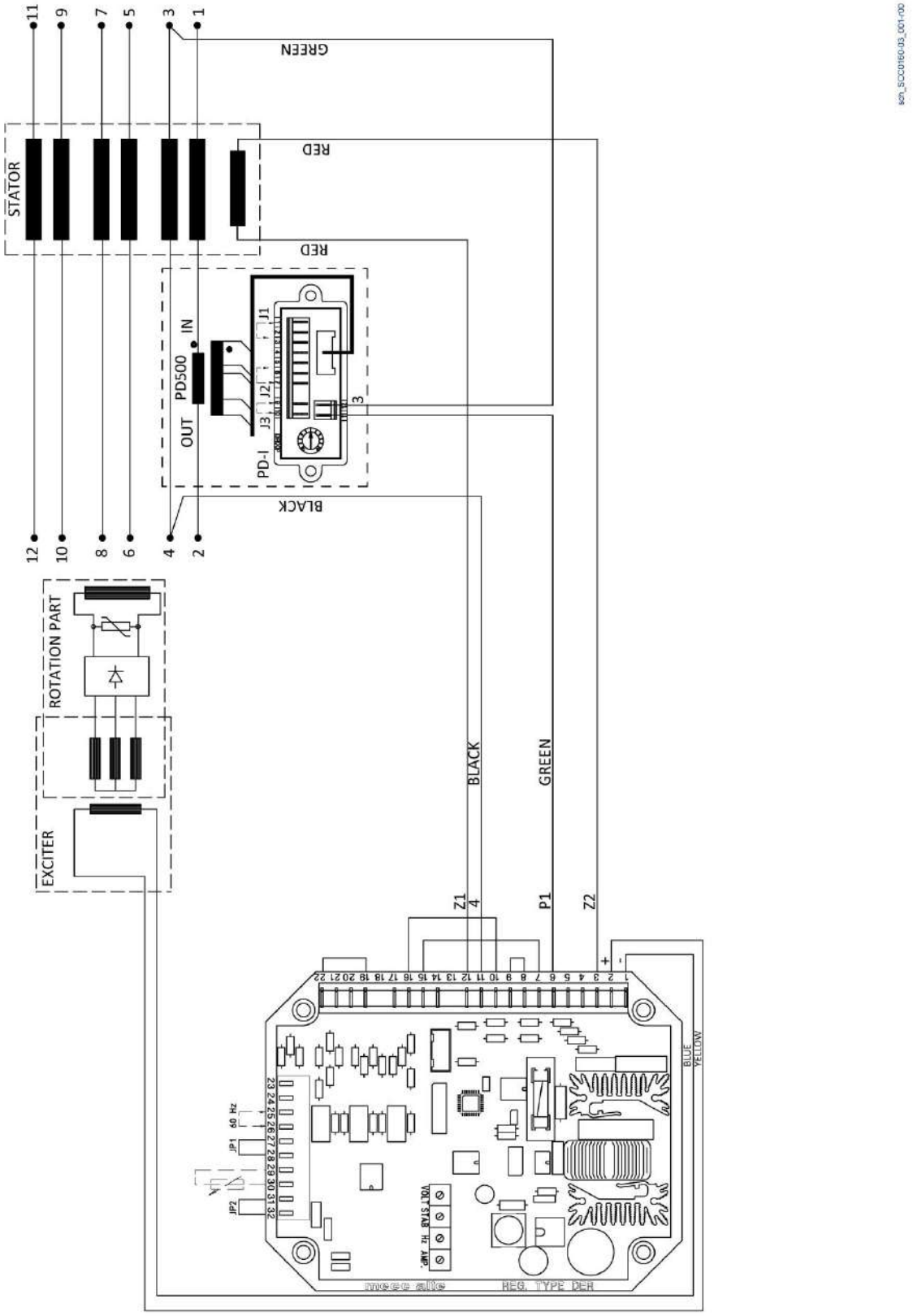


12.2 DER 1 digital regulator electrical diagrams

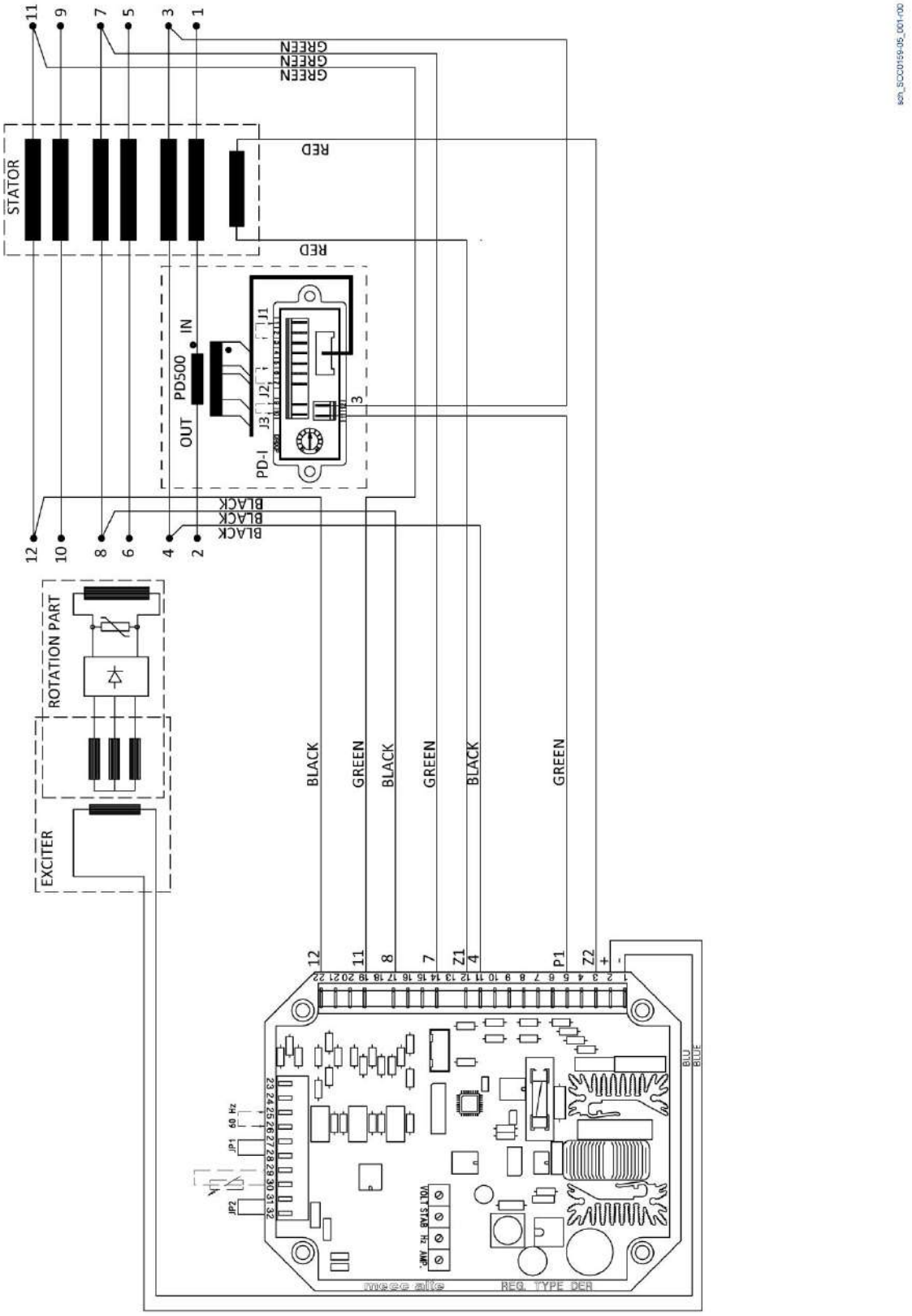
SCC0161: Alternators with 12 terminals, 150 V - 300 V single-phase sensing.



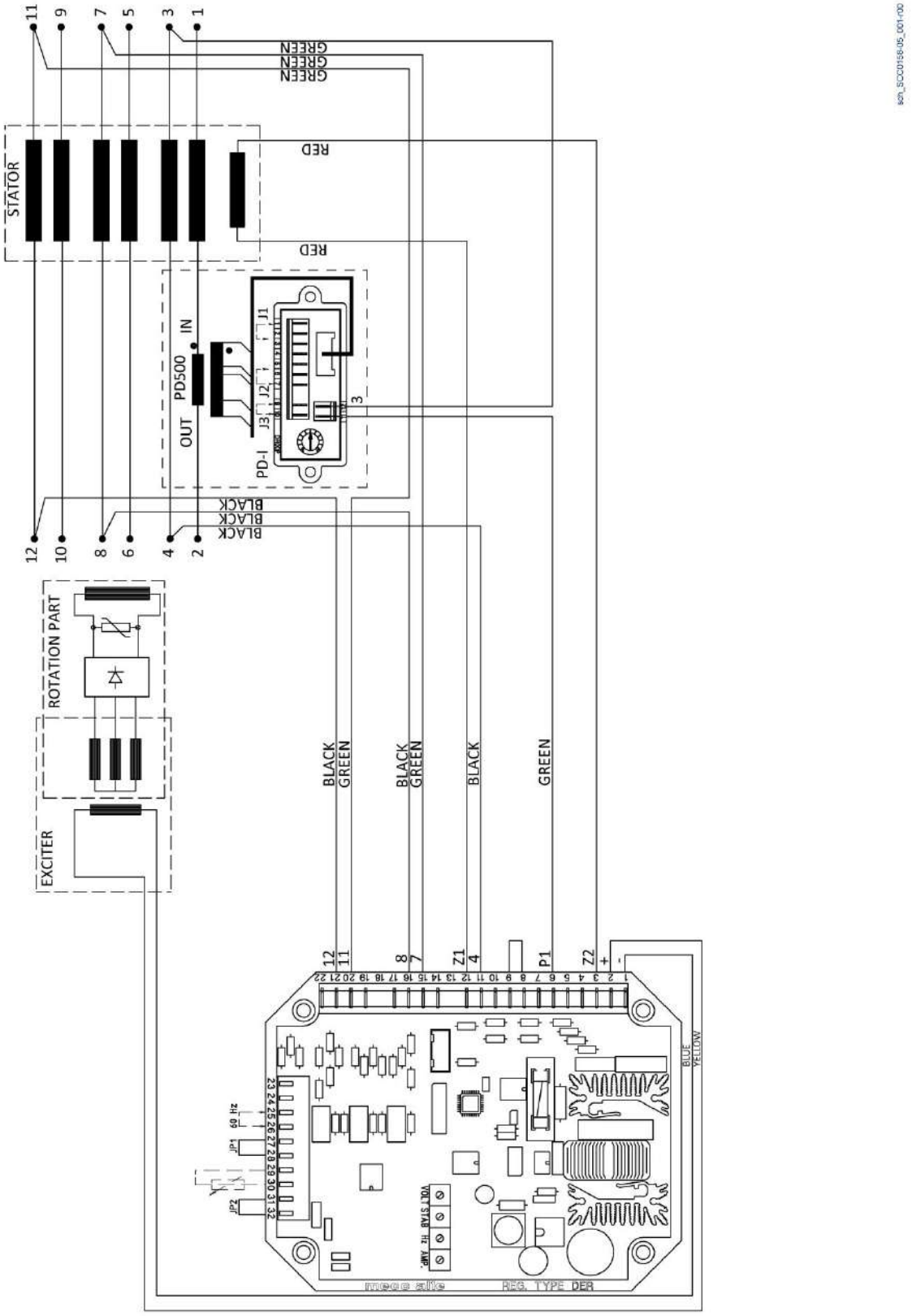
SCC0160: Alternators with 12 terminals, single-phase reference from 75 V to 150 V.



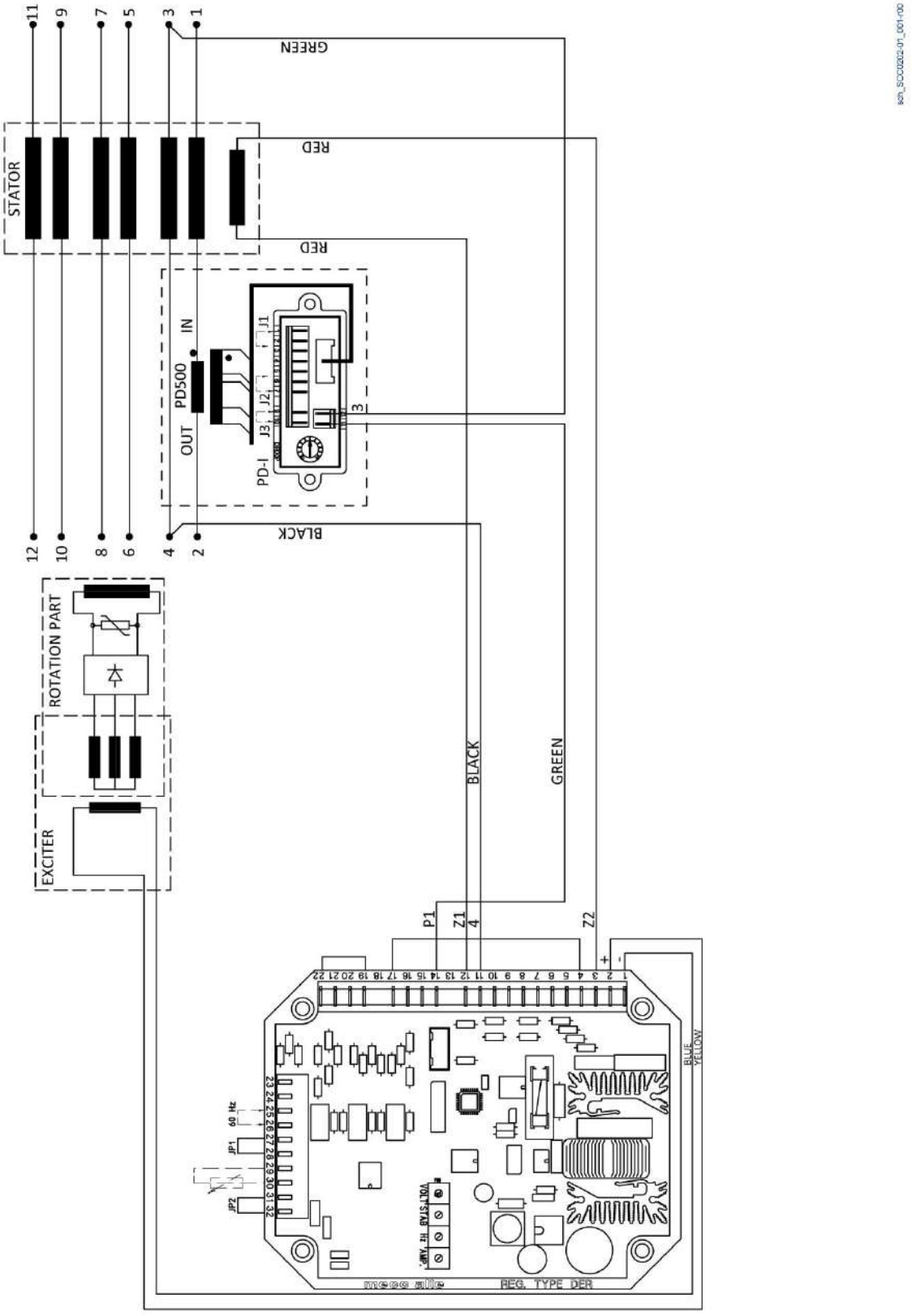
SCC0159: Alternators with 12 terminals, three-phase reference from 150 V to 300 V.



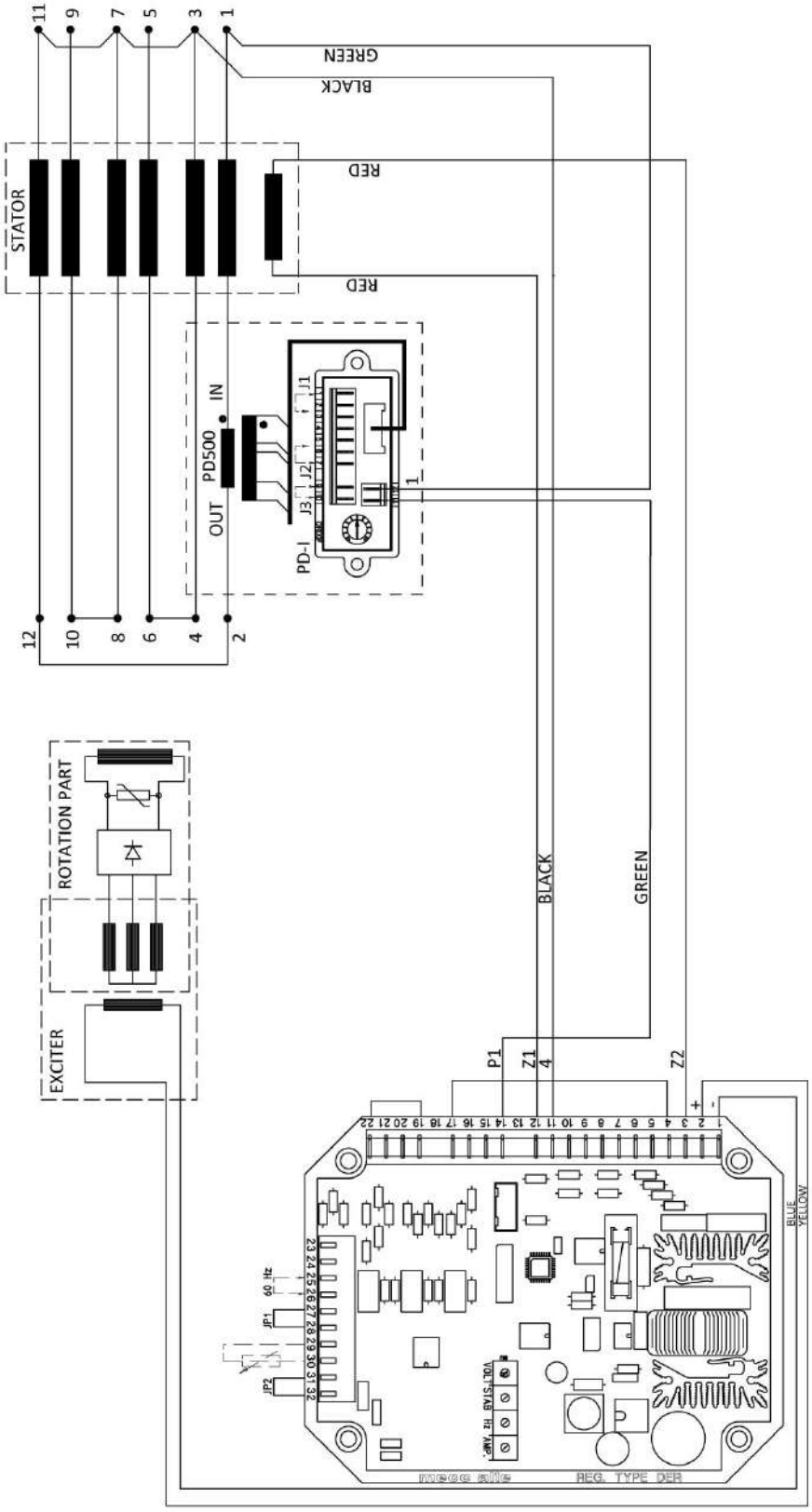
SCC0158: Alternators with 12 terminals, three-phase reference from 75 V to 150 V.



SCC0202: Alternators with 12 terminals, single-phase reference from 300 V to 600 V.

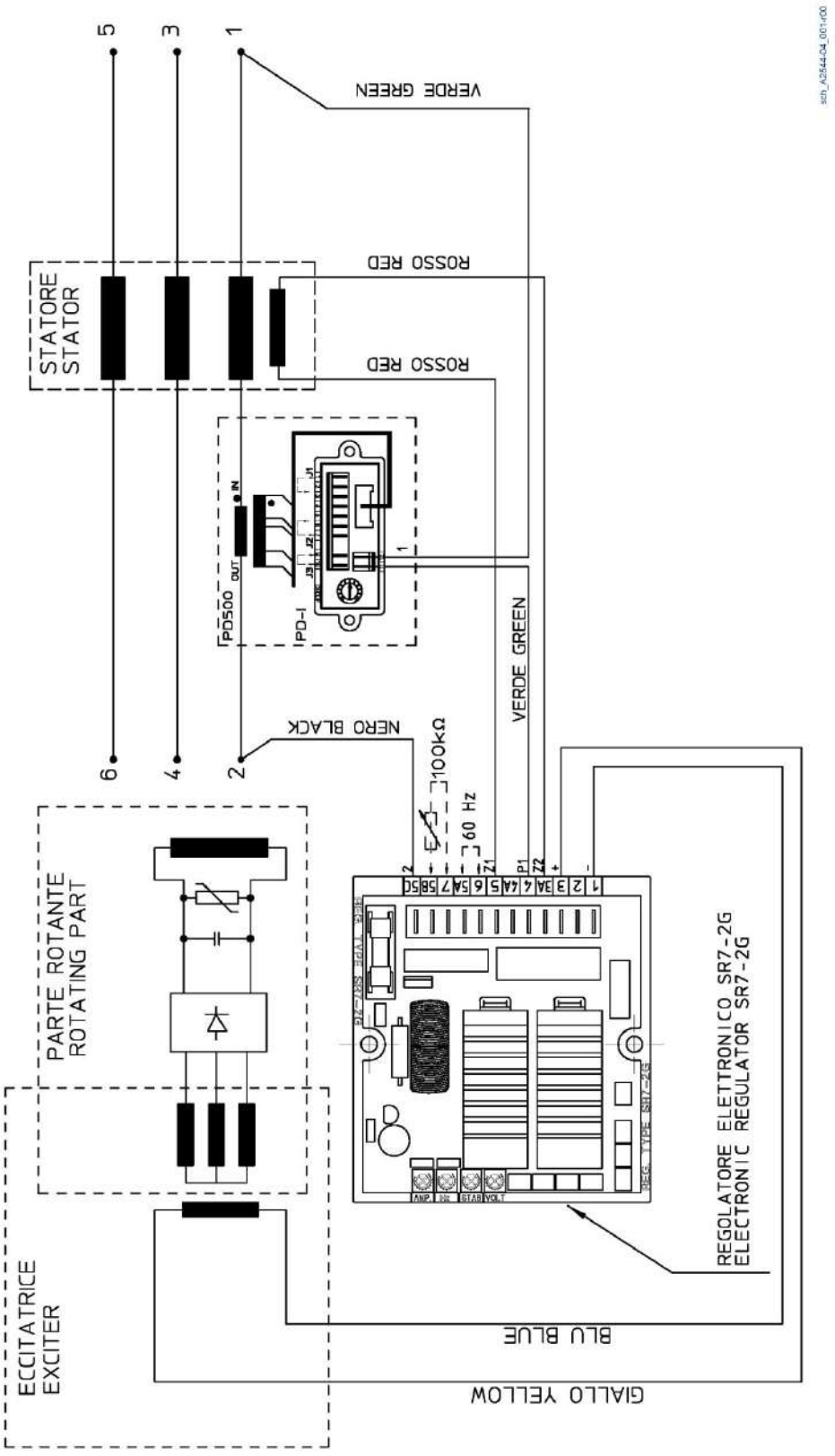


SCC0203: Alternators with 12 terminals, ZIG-ZAG connection, single-phase reference from 300 V to 600 V.

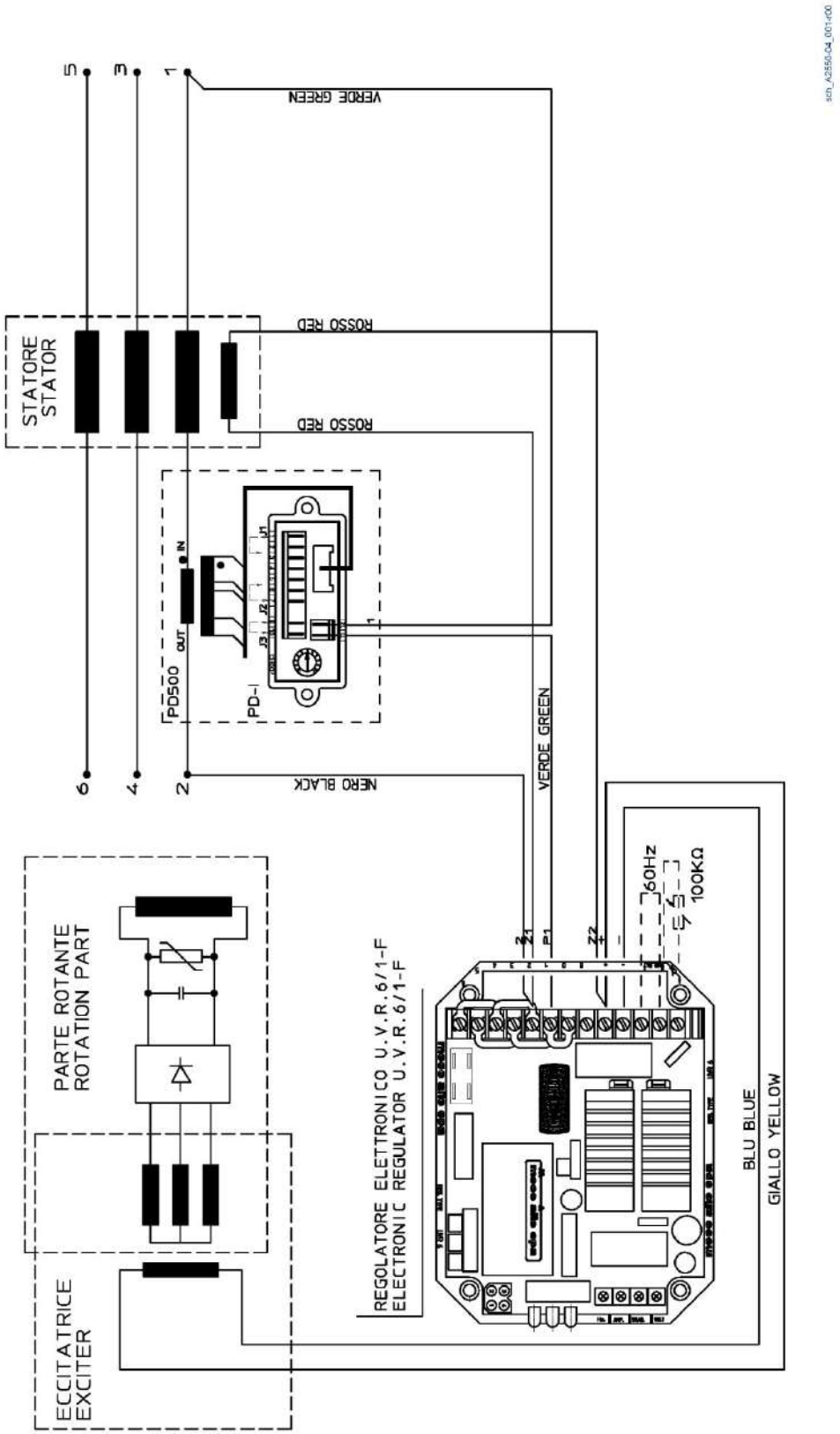


12.3 Electrical diagrams with UVR6 - SR7 regulators

A2544: Alternators with 6 terminals, with SR7 analog regulator.



A2550: Alternators with 6 terminals, with UVR6 analog regulator.



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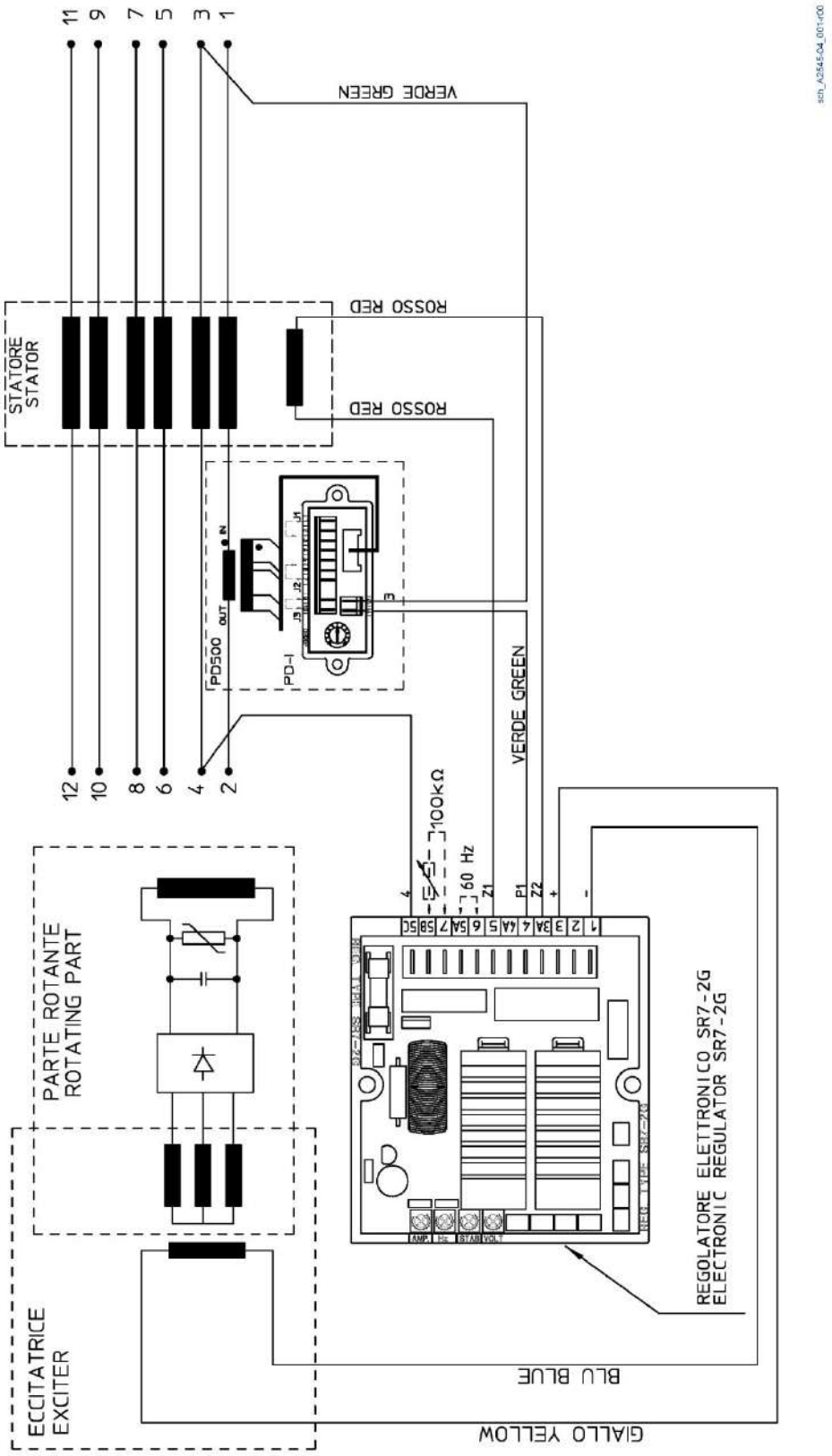
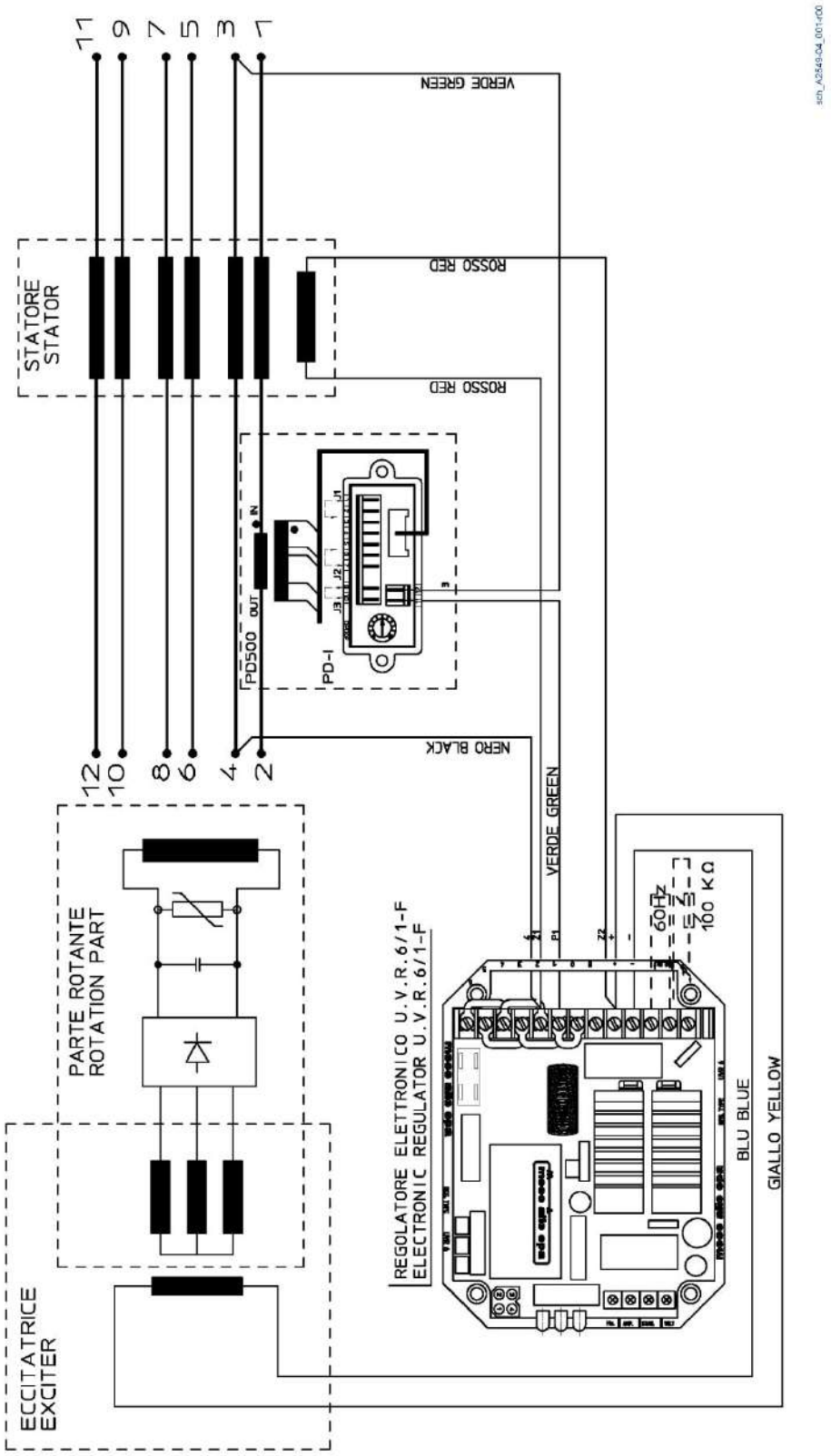
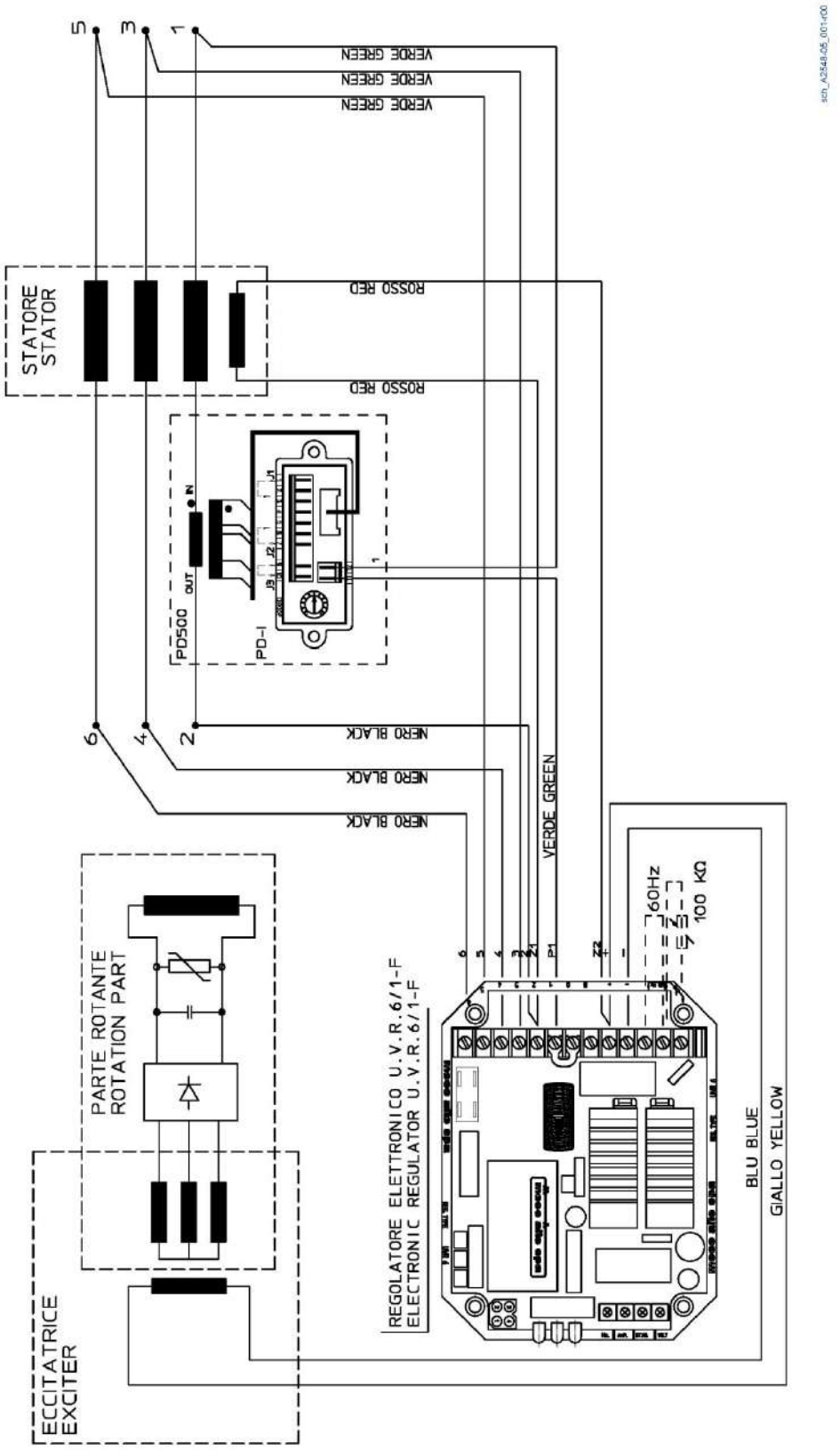
A2545: Alternators with 12 terminals, with SR7 analog regulator.



A2549: Alternators with 12 terminals, with UVR6 analog regulator.



A2548: Alternators with 6 terminals, three-phase reference with UVR6 analog regulator.



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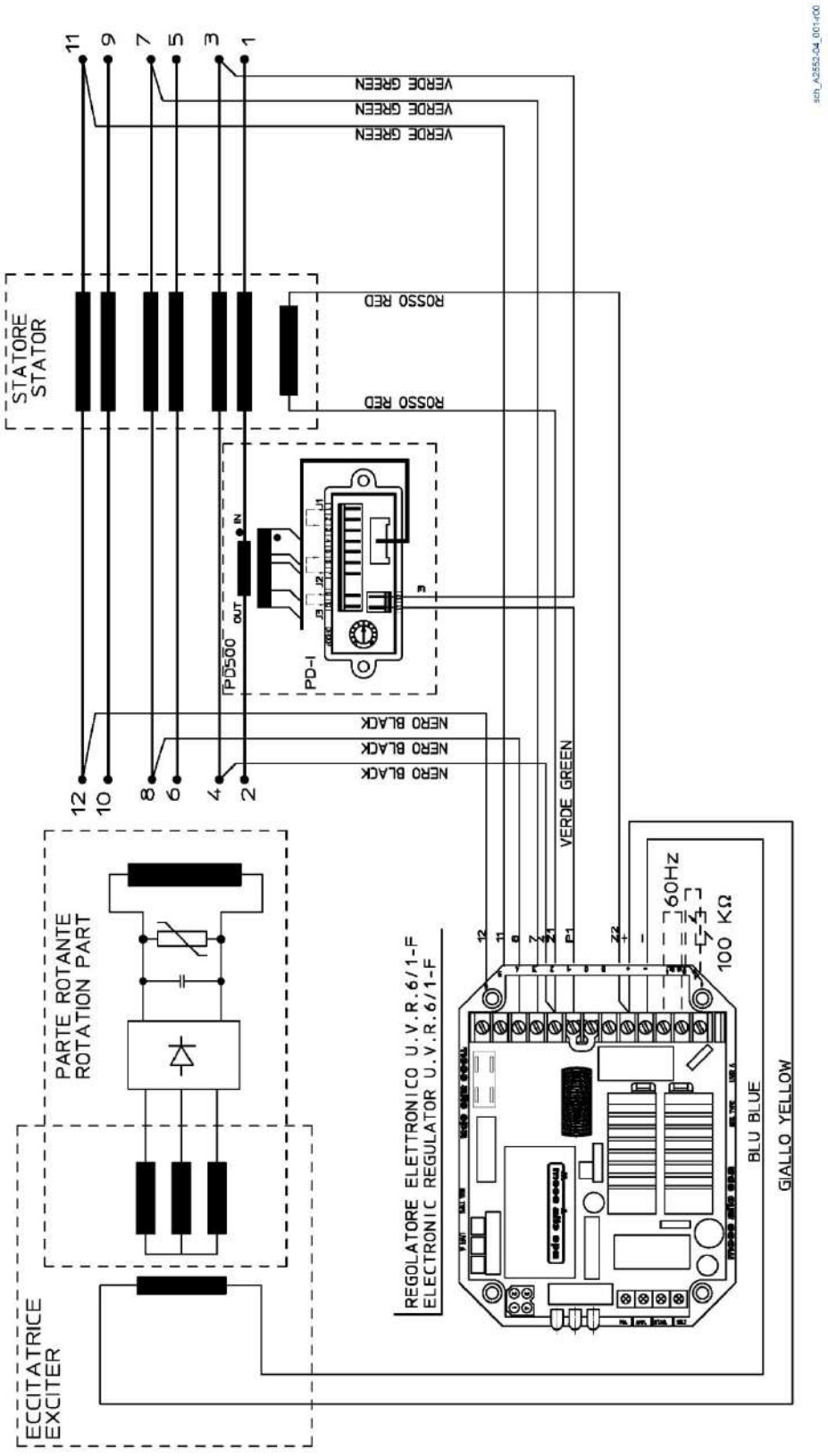
A2552: Alternators with 12 terminals, three-phase reference with UVR6 analog regulator.



13 Replacement parts

13.1 ECP 4C / 4 mounting form MD35

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Spare parts list ECP 4C/4 mounting form MD35

Pos.	Name
1	Front cover (SAE 3, 4, 5)
2	MD35 protection screen
3	Stator with frame
4	Cable grommet diam.50mm
5	7-pin M5 terminal board
6	Exciter stator H 30mm
7	Exciter stator fixing screw
8	Cover tie rod (M, L)
9	Rear bracket
10	Rear cover
11	Disc locking ring
12	DisKS (SAE11 ½, 10, 8, 7 ½, 6 ½)
13	Ring spacer
14	Disks Kit (SAE 11 ½, 10, 8, 7 ½, 6 ½)

Pos.	Name
15	Plastic fan
16	Plastic fan bushing
17	Collar diam. 76x22
18	Main rotor
19	H 30mm rotor exciter
20	6305/2RS rear bearing
21	Regulator plug with screwdriver
22	DSR electronic regulator
23	Side panel - regulator support
24	Side panel - closed
25	Terminal BOX
26	Cover
27	EPDM rubber profile 8.5x5.5mm

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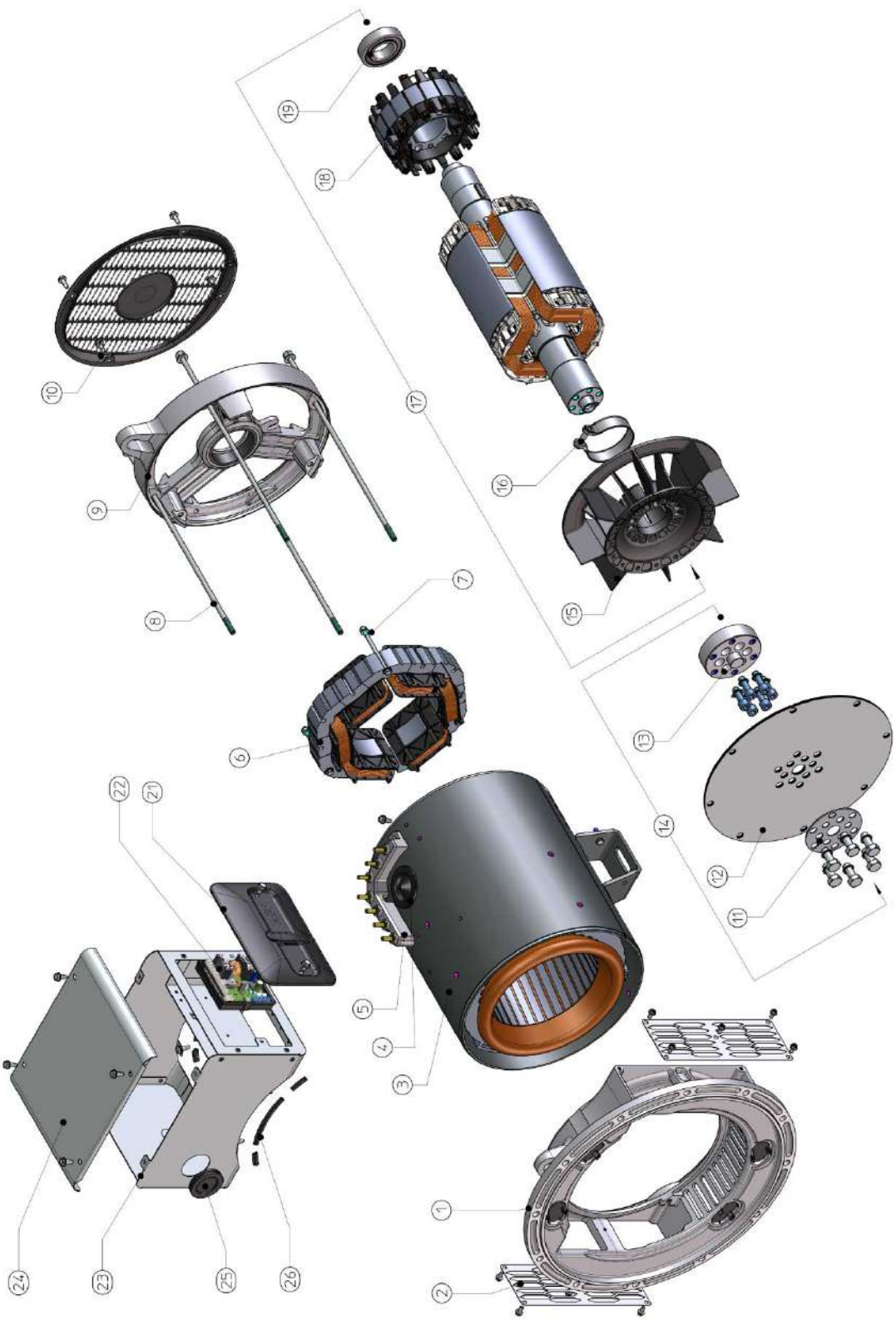
13.2 ECP 28C/4 - Mounting form MD35



Spare parts list ECP 28C/4 mounting form MD35

Pos.	Name
1	Front cover (SAE 2, 3, 4, 5)
2	MD35 protection screen
3	Stator with frame
4	Cable grommet diam.50mm
5	7-pin M6 terminal board
6	Exciter stator H 35mm
7	Exciter stator fixing screw
8	Cover tie rod (VS, S, M, L, VL)
9	Rear bracket
10	Rear cover
11	Disc locking ring
12	DisKS (SAE11 ½, 10, 8, 7 ½, 6 ½)
13	Ring spacer

Pos.	Name
14	Disks Kit (SAE 11 ½, 10, 8, 7 ½, 6 ½)
15	Plastic fan
16	Collar diam. 76x22
17	Main rotor
18	H 35mm rotor exciter
19	6207/2RS rear bearing
21	Regulator plug with screwdriver
22	DSR electronic regulator
23	Terminal box
24	Cover
25	DG48 cable gland
26	Rubber profile PVC 4,5x5x7,6x1mm

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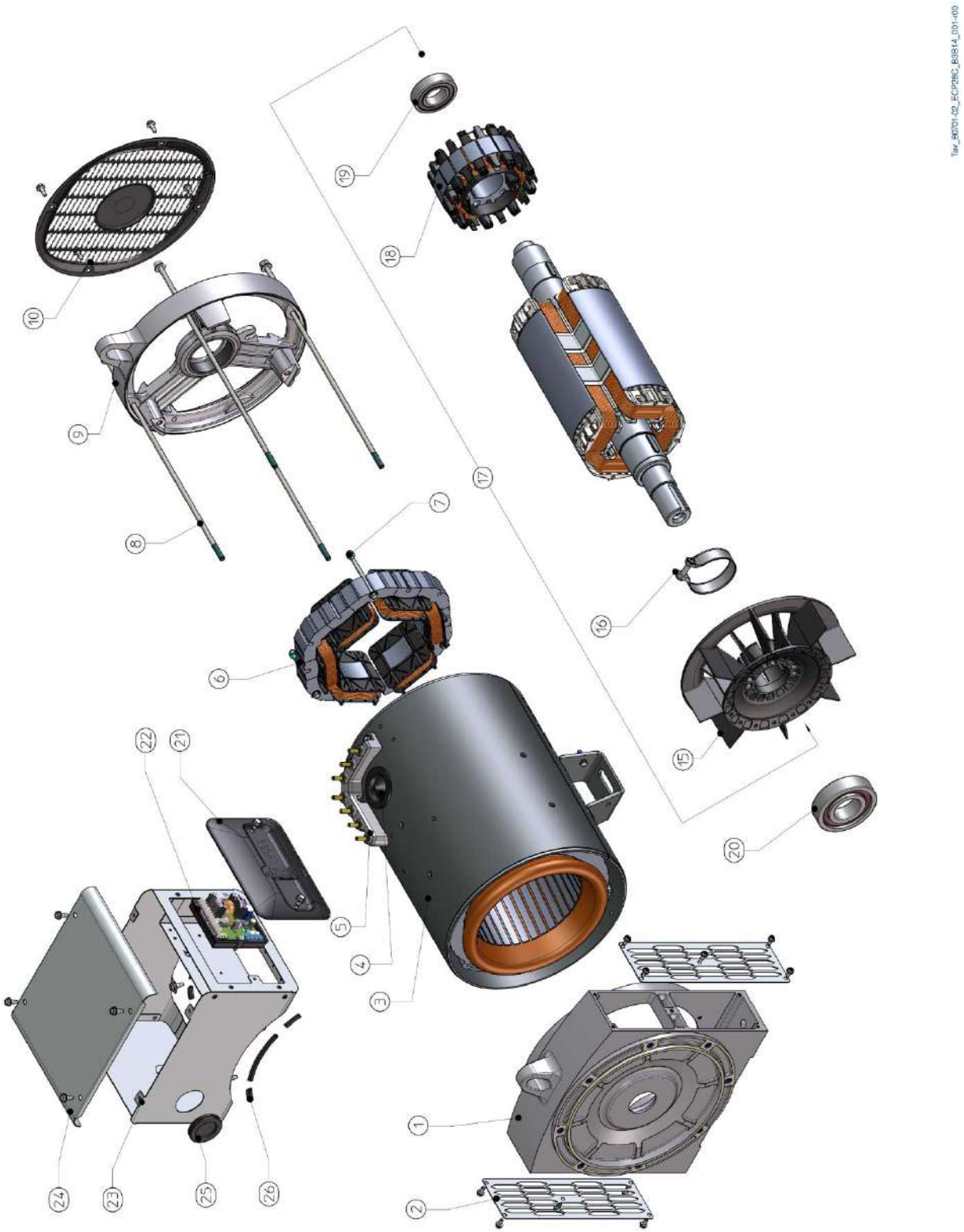
13.3 ECP 28C/4 mounting form B3B14



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Spare parts list ECP 28C/4 mounting form B3B14

Pos.	Name
1	B3/B14 front bracket
2	B3/B14 protection screen
3	Frame with stator
4	Cable grommet diam. 50mm
5	7-pin M6 terminal board
6	H. 35mm stator exciter
7	Exciter stator fixing screw
8	Cover tie rod (VS, S, M, L, VL)
9	Rear bracket
10	Rear cover
15	Plastic fan

Pos.	Name
16	Collar diam. 76x22
17	Main rotor
18	H. 35mm rotor exciter
19	6207/2RS rear bearing
20	6309/2RS front bearing
21	Regulator plug with screwdriver
22	DSR electronic regulator
23	Terminal box
24	Cover
25	Cable grommet DG36
26	Rubber profile PVC 4,5x5x7,6x1mm

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13.4 ECP 30C/4 - Mounting form MD35

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ECP 30C/4 - Mounting form MD35 Spare parts

Pos.	Name
1	Front cover (SAE 3, 4, 5)
2	MD35 protection screen
3	Stator with frame
4	Cable grommet diam.50mm
5	7-pin M6 terminal board
6	Exciter stator H 35mm
7	Exciter stator fixing screw
8	Cover tie rod (M, L)
9	Rear bracket
10	Rear cover
11	Disc locking ring
12	DisKS (SAE11 ½, 10, 8, 7 ½, 6 ½)
13	Ring spacer
14	Disks Kit (SAE 11 ½, 10, 8, 7 ½, 6 ½)

Pos.	Name
15	Plastic fan
16	Collar diam. 76x22
17	Main rotor
18	H 35mm rotor exciter
19	6207/2RS rear bearing
20	Regulator support panel
21	DSR electronic regulator
22	Regulator side terminal box
23	Closed side terminal box
24	Terminal box (Metal)
25	Cover
26	Rubber profile PVC 8,5x5,5mm
27	Cable grommet DG36
28	Reulator plug with screwdriver

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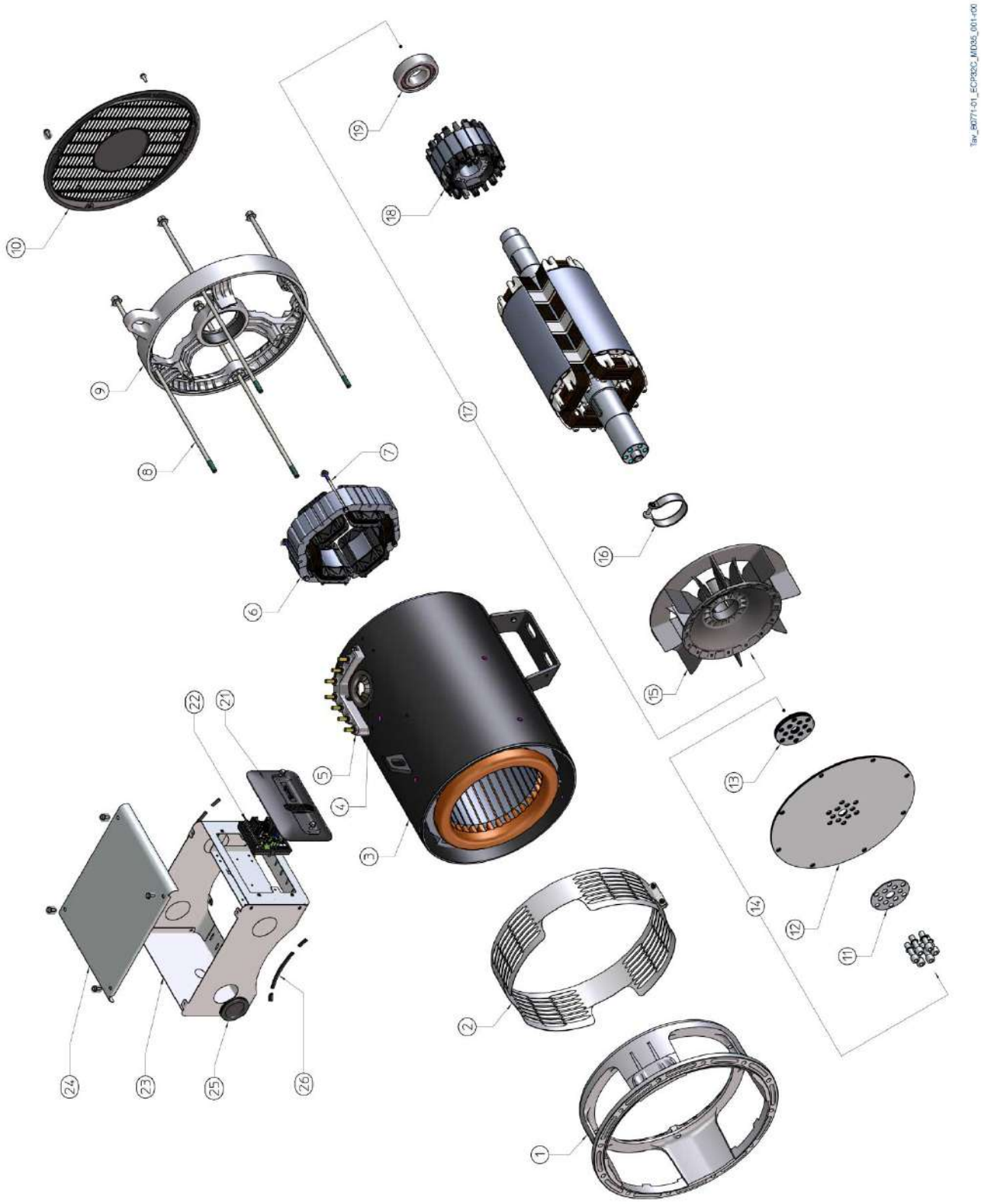
13.5 ECP 32C / 4 mounting form MD35



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Spare parts list ECP 32C/4 mounting form MD35

Pos.	Name
1	Front bracket MD35 SAE 1, 2, 3, 4, 5
2	Protection screen MD35, SAE1/2/4/5 , 3
3	Frame with stator
4	Cable grommet diam. 70mm
5	7-pin M8 terminal board
6	Exciter stator H 45/55 mm
7	Screw fixing st. exciter H45 / 55 mm
8	Cover tie rod S,M,L
9	Rear bracket
10	Rear cover
11	Disc locking ring
12	Disks SAE 11 ½, 10, 8, 7 ½, 6 ½
13	Spacer

Pos.	Name
14	Disks kit SAE 11 ½, 10, 8, 7, 6 ½
15	Plastic fan
16	Collar diam. 82x22
17	Main rotor
18	Exciter rotor H. 45/55 mm
19	6309/2RS rear bearing
21	Reulator plug with screwdriver
22	DSR electronic regulator
23	Terminal box
24	Cover
25	Cable gland DG48
26	Rubber profile PVC 4.5x5x7, 6x1mm

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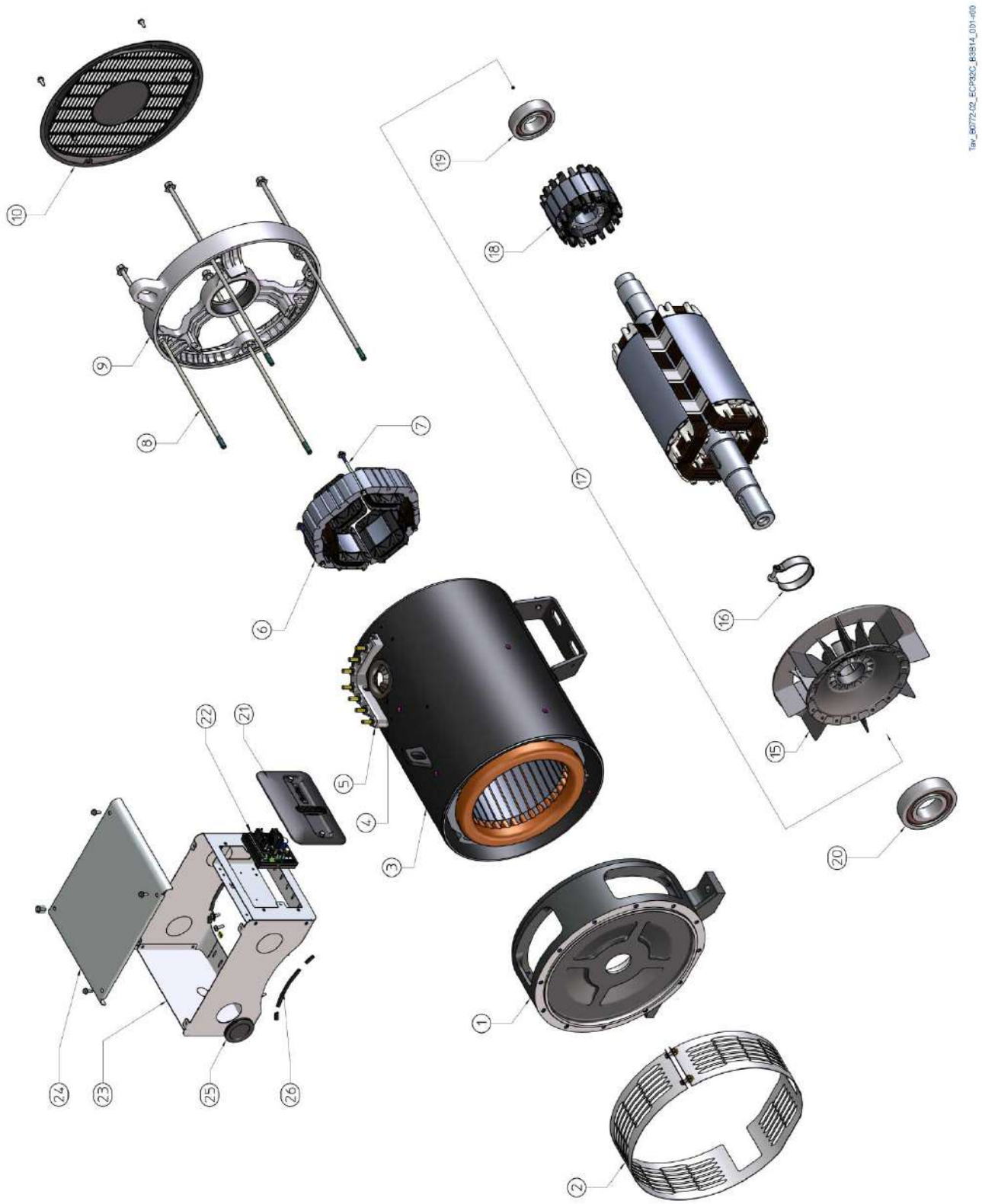
13.6 ECP 32C / 4 mounting form B3B14



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Spare parts list ECP 32C/4 type B3B14

Pos.	Name
1	B3/B14 front bracket
2	B3/B14 protection screen
3	Frame with stator
4	Cable grommet diam. 70mm
5	7-pin M8 terminal board
6	Exciter stator H. 45mm or 55mm
7	Fixing screw st. exciter H 45mm or 55mm
8	Cover tie rod S, M, L
9	Rear bracket
10	Rear cover
16	Collar diam. 82x22

Pos.	Name
17	Main rotor
18	Exciter rotor H.45mm or 55mm
19	6309/2RS rear bearing
20	6312/2RS front bearing
21	Regulator plug with scredriver
22	DSR electronic regulator
23	Terminal box
24	Cover
25	Cable gland DG48
26	Rubber profile PVC 4,5x5x7,6x1mm

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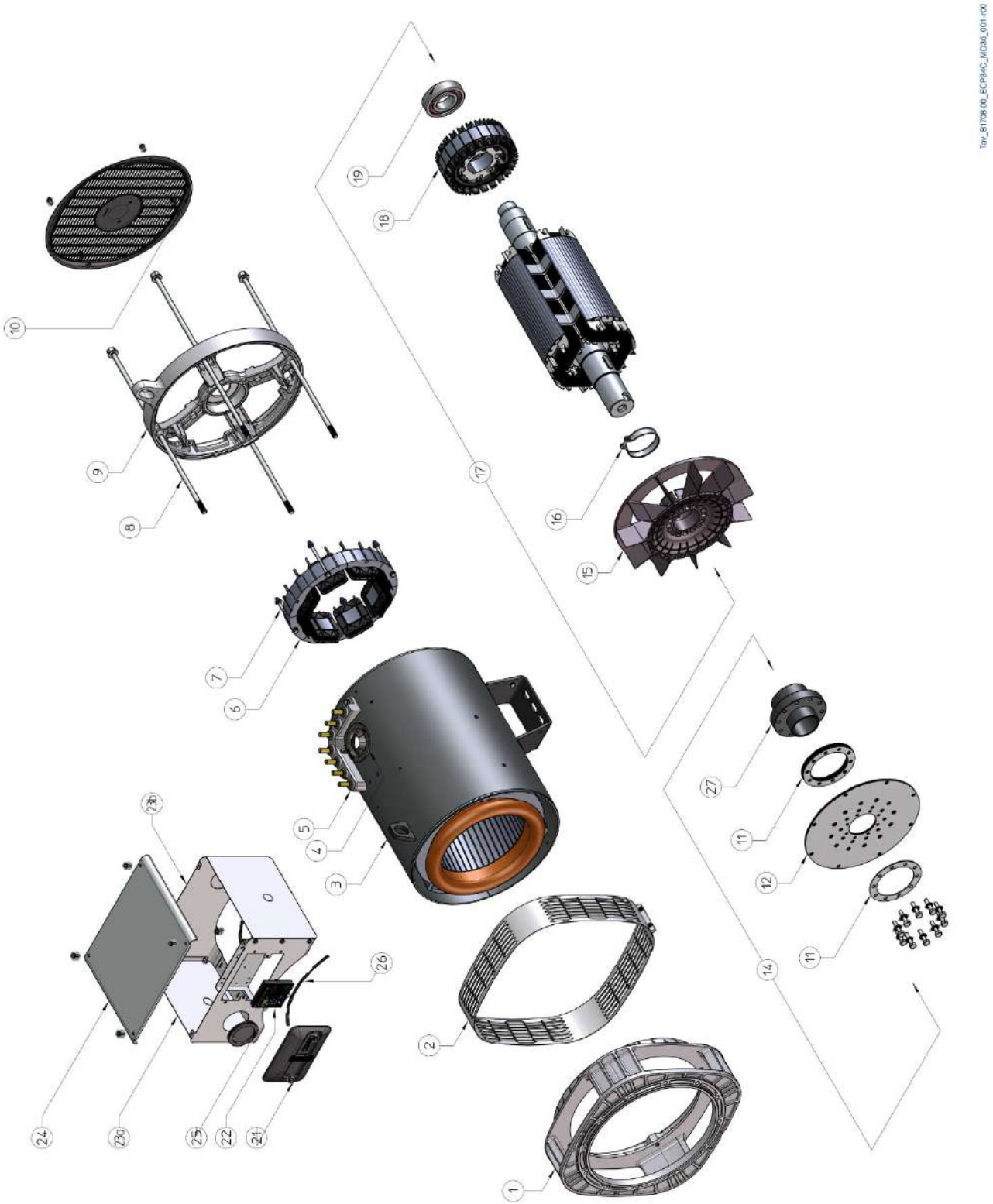
13.7 ECP 34C / 4 mounting form MD35



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Spare parts list ECP 34C/4 mounting form MD35

Pos.	Name
1	Rear Grid
2	Terminal box cover
3	Terminal board
4	Rear bracket
5	Frame with stator
6	MD35 SAE1 front bracket
7	Exciter stator fixing screw
8	Cover tie rod S,M,L
9	Rear bracket
10	Rear cover
11	Disc locking ring
12	Disks SAE 14, 11 ½, 10
14	Disks Kit SAE 14, 11 ½, 10
15	Plastic fan

Pos.	Name
16	Collar diam. 76x22
17	Main rotor
18	45mm exciter rotor
19	6311/2RS rear bearing
21	Reulator plug with screwdriver
22	DSR electronic regulator
23a	Side panel - regulator support
23b	Side panel - closed
24	Cover
25	Cable grommet DG69
26	Rubber profile PVC 4.5x5x7, 6x1mm
27	Universal hub

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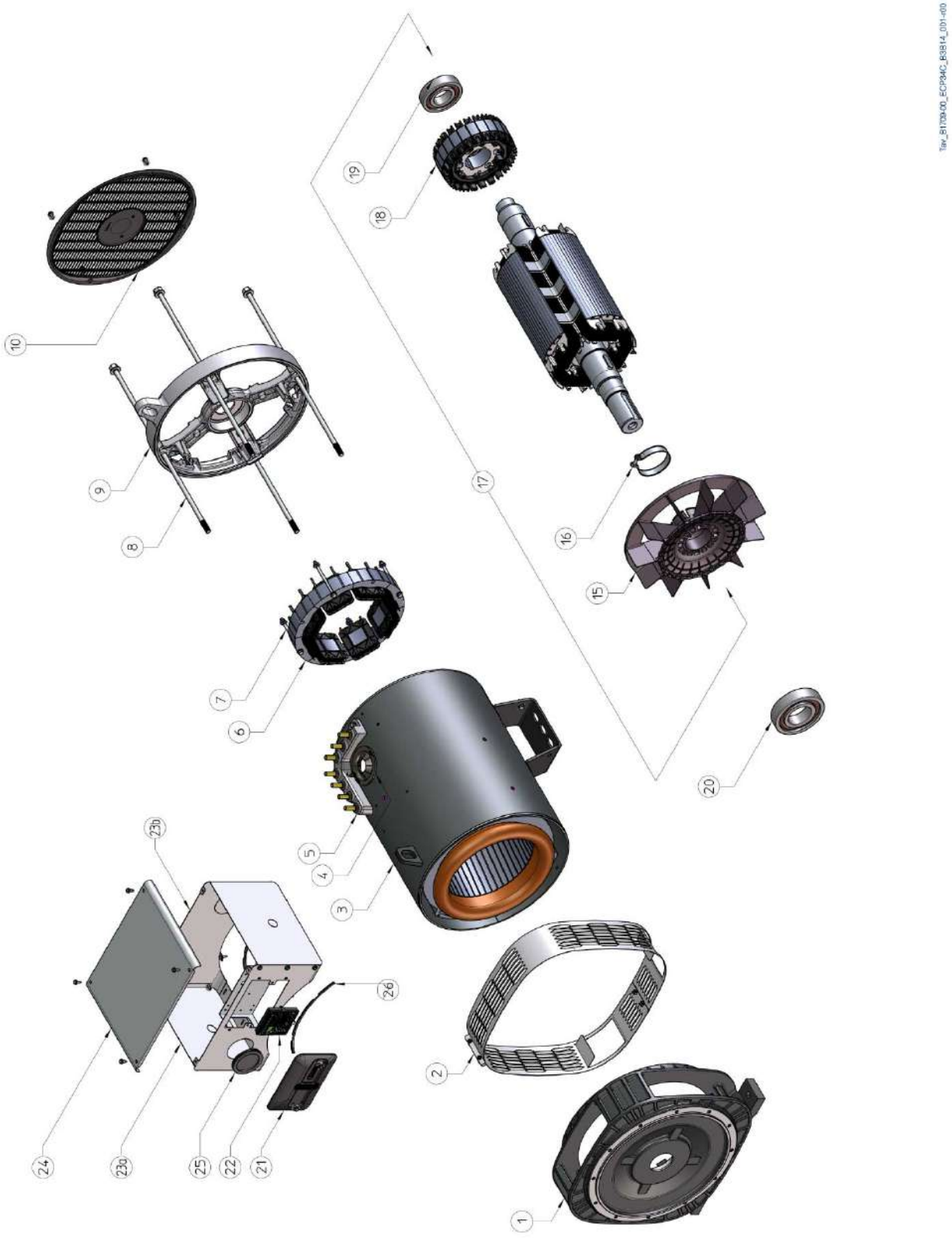
13.8 ECP 34C/4 mounting form B3B14



Spare parts list ECP 34C/4 mounting form B3B14

Pos.	Name
1	B3B14 front bracket
2	B3B14 protection screen
3	Frame with stator
4	Cable grommet diam. 90mm
5	7-pin M12 terminal board
6	45mm exciter stator
7	Exciter stator fixing screw
8	Cover tie rod S, M, L
9	Rear bracket
10	Rear cover
15	Plastic fan
16	Collar diam. 76x22
17	Main rotor
18	45mm exciter rotor

Pos.	Name
19	6311/2RS rear bearing
20	6314/2RS front bearing
21	Regulator plug with scredriver
22	DSR electronic regulator
23a	Side panel - regulator support
23b	Side panel - closed
24	Cover
25	Cable grommet DG69
26	Rubber profile PVC 4,5x5x7,6x1mm

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14 Dismantlement and disposal

To dispose of the alternator or its components you will have to recycle it, keeping in mind the nature of its various components (for instance: metals, plastic parts, rubber, oil and so on).
You will have to designate specialized companies for this purpose and , however, observe the waste management applicable laws.

Most of the materials used in the alternators can be recycled by specialized waste management companies. The instructions contained in this chapter are recommendations to follow for environmentally sound disposal; the user has the responsibility of observing local regulations.

For indicative percentages of the materials used in Mecc Alte alternators see paragraph 2.3.10.

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